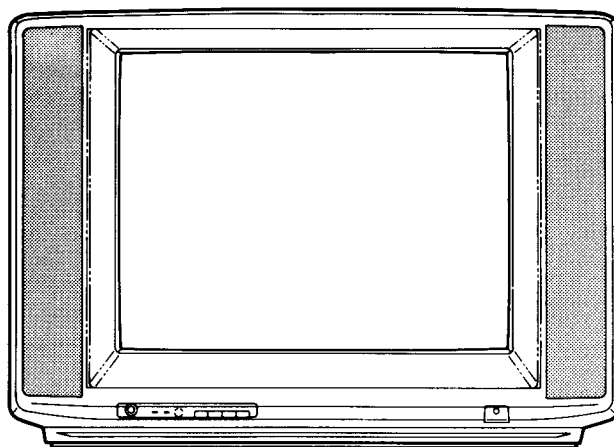


# TOSHIBA

## COLOUR TELEVISION

# 2112DDT



### SPECIFICATIONS

|                           |  |  |
|---------------------------|--|--|
| Input Power Rating:       | AC 220 volts, 50 Hz  | 123W   |
| Aerial Input Impedance:   | 75 ohm unbalanced type for VHF and UHF   |  |
| Receiving Channels:       | PAL B/G Standard, SECAM B/G Standard:  |  |
|                           | VHF .....  | channels 2 to 4, 5 to 12, S1 to S20 and S20 to S41 |
|                           | UHF .....  | channels 21 to 69                                  |
|                           | PAL D/K, SECAM D/K Standard:   |  |
|                           | VHF .....  | channels 1 to 12                                   |
|                           | UHF .....  | channels 21 to 69                                  |
|                           | PAL, SECAM 50 Hz / 60 Hz (For Video Disk playback)   |  |
|                           | 4.43NTSC (For VCR playback), 3.58/5.5 NTSC (For VCR playback)  |  |
| Intermediate Frequencies: | Picture I-F carrier frequency .....  | 38.9 MHz   |
|                           | Sound I-F carrier frequency .....  |  |
|                           | B/G System .....   | 33.4 MHz   |
|                           |  | 33.16 MHz  |
|                           | D/K System .....   | 32.4 MHz   |
| Picture Tube:             | 21 inches, A51EAL30X01, 510 mm (measured on diagonal of viewable picture area), 90° deflection             |  |
| Sound Output:             | 10.0 watts (at 10% harmonic distortion) x 2  |  |
| Speakers:                 | 120 mm x 60 mm, 2 pcs  |  |
| Aux. Terminals:           | Headphone Jack, 21 pin socket, S-VIDEO/AUDIO socket, External speaker terminal, AUDIO / VIDEO input socket |  |
| Cabinet:                  | Table type   |  |
| Dimensions:               | Height .....   | 463 mm   |
|                           | Width .....  | 654 mm   |
|                           | Depth .....  | 489 mm   |
| Weight:                   | 21.5 kg  |  |

Specifications are subject to change without notice.



## SAFETY INSTRUCTIONS

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" INSTRUCTIONS BELOW.

### X-RAY RADIATION PRECAUTION

1. The E.H.T. must be checked every time the receiver is serviced to ensure that the C.R.T. does not emit X-ray radiation as result of excessive E.H.T. voltage. The nominal E.H.T. for this receiver is 26.3 kV at zero beam current (minimum brightness) operating at 220V a.c. The maximum E.H.T. voltage permissible in any operating circumstances must not exceed 27.5 kV. When checking the E.H.T., use the 'High Voltage Check' procedure in this manual using an accurate E.H.T. voltmeter.
2. The only source of X-RAY radiation in this receiver is the C.R.T. To prevent X-ray radiation, the replacement C.R.T. must be identical to the original fitted as specified in the Parts List.
3. Some components used in this receiver have safety related characteristics preventing the C.R.T. from emitting X-ray radiation.  
For continued safety, replacement component should only be made after referring the Product Safety Notice below.

### SAFETY PRECAUTION

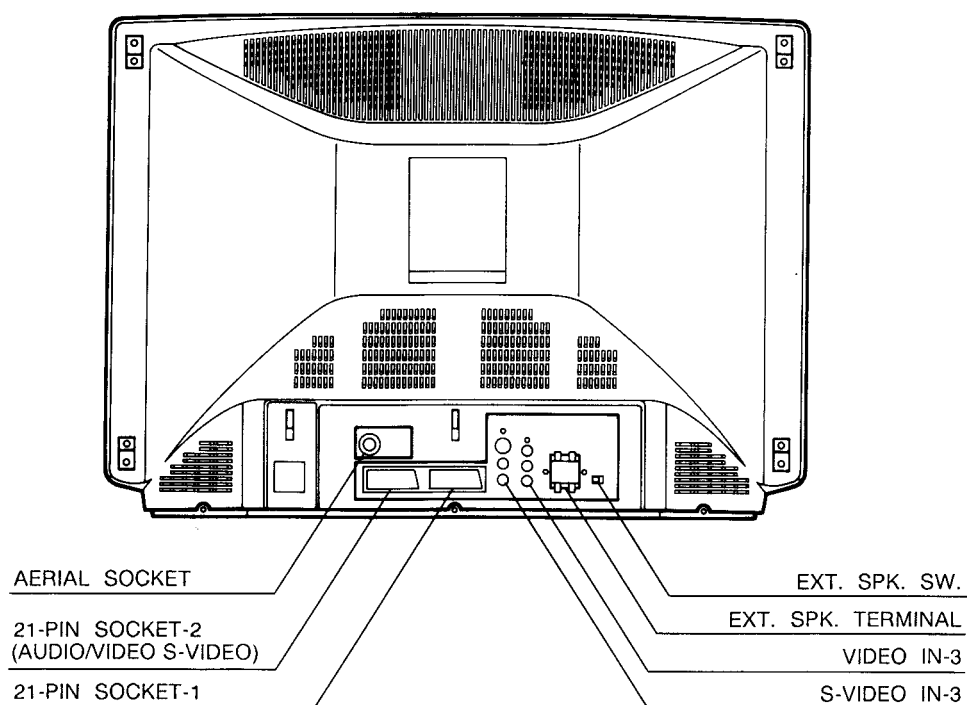
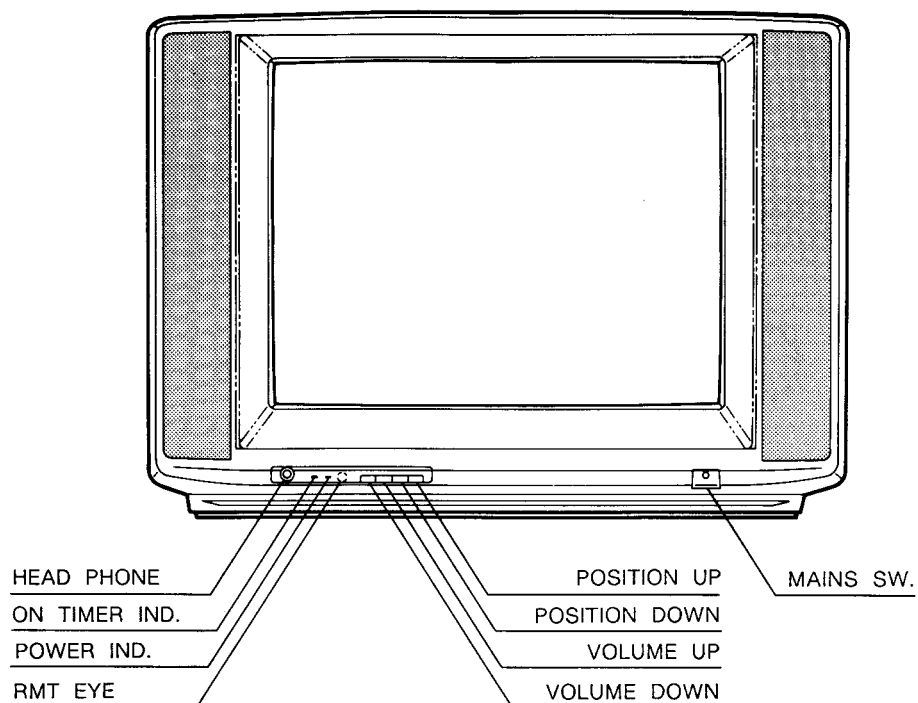
1. This receiver has a nominal working E.H.T. voltage of 23.5 kV. Extreme caution should be exercised when working on the receiver with the back removed.  
Do not attempt to service this receiver if you are not conversant with the precautions and procedures for working on high voltage equipment.  
When handling or working on the C.R.T., always discharge the anode to the receiver chassis before removing the anode cap.  
The C.R.T., if broken, will violently expel glass fragments. Use shatter proof goggles and take extreme care while handling.  
Do not hold the C.R.T. by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all cable forms be replaced exactly as supplied from factory.
3. A small part of the chassis used in this receiver is, when operating, at approximately half mains potential at all times. It is therefore essential in the interest of safety that when serving or connecting any test equipment the receiver should be supplied via a suitable isolating transformer of adequate rating.
4. Replace blown fuses within the receiver with the fuse specified in the parts list.
5. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be a Toshiba approved type and must be mounted as the original.
6. Keep wires away from high temperature components.

### PRODUCT SAFETY NOTICE

Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the schematic diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.

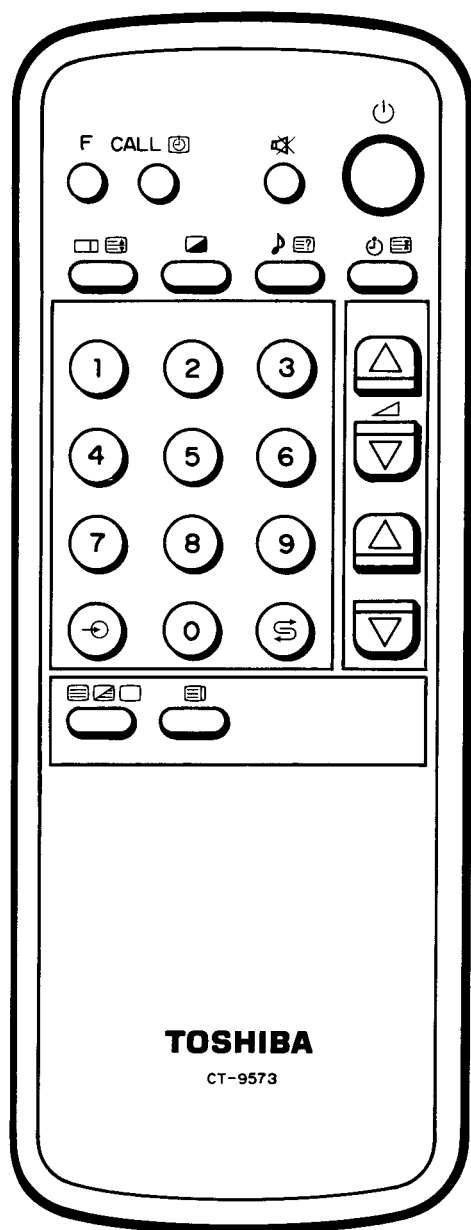


## FRONT CONTROLS AND REAR VIEWS





# REMOTE HAND HELD UNIT



## KEY ASSIGNMENT

|        |       |   |   |       |            |
|--------|-------|---|---|-------|------------|
| ⏻      | ..... | ON STANDBY  | 🔇 | ..... | MUTE       |
| CALL   | ..... | CH. DISPLAY CALL [+F ; TIME DIAPLAY 🕒 ]   |   |       |            |
| F      | ..... | DOUBLE PUSH OPERATION KEY<br>(TEXT CONCEAL, QUICK & SERVICE MODE)                                     |   |       |            |
| RED    | ..... | MENU <TV> TUNING & SETTING [ 📺 ]<br>-1 <TEXT> RED (FLOF), ROTATE (NORMAL)<br>[+F ; HOLD 🕒 ]           |   |       |            |
| GRN    | ..... | MENU <TV> PICTURE CONTROL [ 🖼 ]<br>-2 <TEXT> GREEN (FLOF), LIST (NORMAL)<br>[+F ; PICTURE CONTROL 🖼 ] |   |       |            |
| YEL    | ..... | MENU <TV> SOUND CONTROL [ 🎵 ]<br>-3 <TEXT> YELLOW (FLOF), INITIAL (NORMAL)<br>[+F ; REVEAL 🕒 ]        |   |       |            |
| CYN    | ..... | MENU <TV> TIMER MENU [ ⌚ ]<br>-4 <TEXT> CYAN (FLOF)<br>[+F ; F-T-B 🕒 ]                                |   |       |            |
| 1~9, 0 | ..... | TEN KEY   |   |       |            |
| +      | ..... | LEVEL PLUS (VOLUME, MENU)<br>[+F ; QUICK OPERATION]   |   |       |            |
| -      | ..... | LEVEL MINUS (VOLUME, MENU)<br>[+F ; QUICK OPERATION]  |   |       |            |
| ▲      | ..... | UP (POS., CH.-Search, TEXT PAGE, MENU)  |   |       |            |
| ▼      | ..... | DOWN (POS., CH.-Search, TEXT PAGE, MENU)  |   |       |            |
| 🔄      | ..... | VIDEO INPUT/TV  | ⏮ | ..... | PREVIOUS   |
| 📺🖼🎵    | ..... | TEXT/MIX/TV   | 📖 | ..... | TEXT INDEX |



**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

## INSTALLATION AND SERVICE ADJUSTMENTS

### GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials. Plug the power cord into a convenient 220 volts 50 Hz AC two pin power outlet. Turn the receiver ON. Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

### AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least one hour in order that the automatic degaussing circuit operates properly. Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source.

### HIGH VOLTAGE CHECK

**CAUTION:** There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 27.5 kV.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 27.5 kV under any conditions.

### HEIGHT ADJUSTMENT

1. Receive the WG PHILIPS pattern, and set the contrast and colour to centre, and the brightness to centre.
2. Change the VERT POSITION SW (S301) so the round shape in the pattern is located in the centre of screen.
3. HEIGHT Control (R351) on MAIN Board changes the size of the picture or pattern, having an equal effect on the top and bottom. Make final adjustment to overscan the mask 2 cm at top and bottom.

### HORIZONTAL CENTRE ADJUSTMENT

1. Receive the WG PHILIPS pattern.
2. Set the contrast and colour to centre, and the brightness to centre.
3. Adjust Sub Address HPS so the pattern centre can be located at the screen centre.

### FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

### SIF DET ADJUSTMENT

1. Connect SIF generator to pin 2 of ICG30 through 0.01  $\mu$ F capacitor.
2. Connect the oscilloscope to pin 9 of ICG30.
3. Set up the SIF generator as described below.
  - Sound carrier frequency : 5.74 MHz
  - Modulation frequency : 1000 Hz
  - Frequency deviation :  $\pm 15$  kHz
  - Signal level : 80 dB $\mu$  (50 ohm load)
4. Adjust LG80 for the maximum response of 1000 Hz det-out on scope.
5. Connect SIF generator to pin 2 of ICG03 through 0.01  $\mu$ F capacitor.
6. Connect oscilloscope to pin 9 of ICG03.
7. Connect the wire between pin SQ of PG02 and +12V.
8. Set up the SIF generator as described below.
  - Sound carrier frequency : 6.5 MHz
  - Modulation frequency : 1 kHz
  - Frequency deviation : +15 kHz
  - Signal level : 80 dB $\mu$  (50 ohm load)
9. Adjust LG05 for the maximum response of 1 kHz det-out on scope.
10. Change the wire between pin SQ of PG02 and ground.
11. Change the sound carrier frequency to 5.5 MHz
12. Adjust CG55 for the maximum response of 1 kHz det-out on scope.



### BELL COIL (LM01) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the synchroscope to the terminal Pin 2 of LM01.
3. Adjust LM01 for the flat level of amplitude in each colour bar waveform on the scope. (See figure 1.)

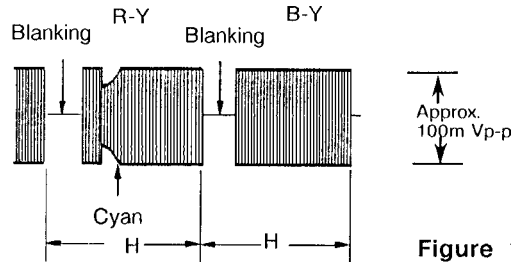


Figure 1.

### IDENT COIL (LM04) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Connect the DC voltmeter (Digital Voltmeter) to the pin 23 of IC501.
3. Adjust LM04 for the maximum indication (approx. DC10V) on the meter.

### B-Y, R-Y DEMOD COIL (LM02, LM03) ADJUSTMENT

1. Receive SECAM colour bar signal.
2. Set the COLOUR, BRIGHTNESS and CONTRAST Controls free.
3. Connect the synchroscope to the pin 62 of IC501.
4. Adjust LM02 so that the white level in picture part reaches to the vertical retrace line. (See figure 2.)
5. Then change the connection of synchroscope from the pin 62 to the pin 60 of IC501.
6. Adjust LM03 so that the white level in picture part reaches to the vertical retrace line. (See figure 3.)

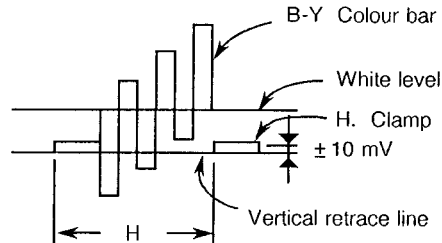


Figure 2.

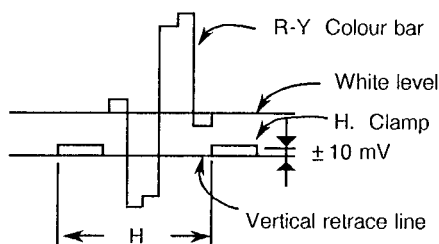


Figure 3.

### PAL MATRIX ADJUSTMENT

1. Tune in the colour programme of the Philips pattern.
2. Set the COLOUR Control to obtain the proper colour.
3. If the PAL MATRIX adjustment is incorrect, the Venetian Blind would appear in the colour bars area. This case needs the adjustment.
4. At the first, adjust DL PHASE ADJ. Coil (L551) to minimize the Venetian Blind.
5. Next adjust 1H-DL ADJ. VR (R551) to minimize the Blind.
6. If the Venetian Blind still remains, adjust 1H-DL PHASE ADJ. Coil (L551) to minimize the Blind.



7. Repeat the item 5 and 6 procedures, adjust the R551 and L551 until the Blind does not appear.

### CRT GREY SCALE ADJUSTMENT

1. Tune in an active channel.
2. Set "SERVICE MODE" by RMT H.H.U. ( (F) + (→) and (1), (0), (4), (8) )
3. Turn the SCREEN Control (on T461) fully counter-clockwise.
4. By rotating the RED, GREEN and BLUE CUT OFF Controls (R557, R558, R559) to the mid position.
5. Set the GREEN and BLUE DRIVE Controls (R252, R253) to the center.
6. Set the "CUT OFF (No Vertical Deflection) MODE" by RMT H.H.U. ( (F) + (2) key )
7. Rotate the SCREEN Control gradually clockwise until the first line appears slightly on the screen. Set the SCREEN Control to this position.
8. Adjust the CUT OFF Controls to obtain the slightly lighted horizontal lines in the same levels of three colours (RED, GREEN and BLUE). The lines may look like white if the CUT OFF Controls are adjusted properly.
9. Release the "CUT OFF MODE" by RMT H.H.U. ( (F) + (2) key )
10. Set the CONTRAST and COLOUR Controls to minimum, and BRIGHTNESS Control to the maximum.
11. Adjust the BLUE and GREEN DRIVE Controls (R252/R253) to obtain proper white-balanced picture in high light areas.
12. Set the BRIGHTNESS and CONTRAST Controls to obtain dark grey raster. Then check the white balance in low brightness. If the white balance is not proper, retouch the CUT OFF Controls and DRIVE Controls to obtain a good white balance in both low and high light areas.
13. Exit from the "SERVICE MODE" by turning the power ON/OFF with RMT H.H.U.



### SUB-BRIGHTNESS ADJUSTMENT

1. Tune in a colour programme.
2. Set the "SERVICE MODE" by RMT H.H.U.
3. Set the CONTRAST Control to the maximum and BRIGHT Control to the center.
4. Set the COLOUR Control to the minimum.
5. Select the "SUB" symbol (F +  (Item UP), F +  (Item DN)) and adjust the level to the center by LEVEL key of RMT H.H.U. and leave the TV for five minutes in this state.
6. Watching the picture well, adjust the SUB-BRIGHT Control in the position (same method as in step No.5) where the picture does not show evidence of blooming in high bright area and not appear too dark in low bright portion.
7. Check the proper picture variation by rotating the CONTRAST and BRIGHTNESS Controls to both extremes.
8. If the picture does not appear dark with the CONTRAST and BRIGHTNESS Controls turned to minimum, or not appear bright with the controls turned to the maximum, adjust the SUB-BRIGHT Control again for the acceptable picture.
9. Exit from the "SERVICE MODE" by turning the power ON/OFF with the RMT H.H.U.



## ADJUSTMENT METHOD FOR SERVICING

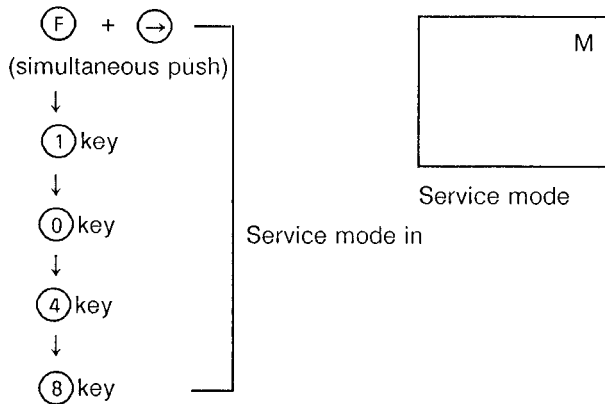
### 1. OUTLINE

Since each IC used is of I<sup>2</sup>C bus control type, readjustment of the TVs also needs adjustment through I<sup>2</sup>C bus control.

In the service mode, sub-bright, deflection system sub-adjustments, picture system sub-adjustments can be made easily with user remote control unit.

### 2. SERVICE MODE OPERATION

#### 2-1. How to Enter the Service Mode



#### 2-2. How to Exit from the Service Mode

Exit the service mode by turning the power on/off with the remote control.

### 3. ADJUSTMENT IN THE SERVICE MODE

#### 3-1. Service Mode Level Adjustments

- (1) Push (F) + (■) key (simultaneous push) (item UP) or (F) + (♪) key (simultaneous push) (item DN) to select item to be adjusted.
- (2) Adjust with the level UP/DN (VOL UP/DN key) key.

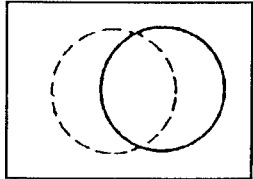
#### 3-2. Other Service Mode Adjustments

(F) + (2) key (simultaneous push) cut off: (NO VERTICAL DEFLECTION) ON/OFF

### 4. SERVICE MODE LEVEL ADJUSTMENT ITEM LIST

| Symbol | RAM No. | Controlled IC       | Item           |
|--------|---------|---------------------|----------------|
| HPS    | 30      | MULTI-COL (TA8783N) | SUB H-POSITION |

### 5. SUB DATA ADDITIONAL DESCRIPTION

| RAM No. | Symbol | Description  |
|---------|--------|--|
| 16      | SUB    | Sub brightness setting   |
| 23      | HPS    | H screen position correction.<br> |



# 6. ROM DATA LIST FOR IIC BUS CONTROL

(Reference Value)

| RAM No. | Symbol | Comment                  | Data |
|---------|--------|--------------------------|------|
| 16      | SUB    | SUB BRIGHTNESS           | * 31 |
| 17      | SBM    | BRIGHTNESS ADJUST. WIDTH | 28   |
| 18      | SCN    | SUB CONTRAST             | 32   |
| 19      | SCM    | CONTRAST MINIMUM         | 10   |
| 20      | SCL    | SUB COLOUR               | 34   |
| 21      | SC3    | SUB COLOUR 3.58          | 31   |
| 22      | STI    | SUB TINT                 | 44   |
| 23      | HPS    | H. POSITION              | * 40 |
| 24      | SS4    | SHARPNESS CENTER 4.43    | 20   |
| 25      | SS3    | SHARPNESS CENTER 3.58    | 50   |
| 26      | IGR    | STEREO SEPARATION        | 47   |
| 27      | FLT    | TONE FILTER              | —    |
| 28      | RFA    | RF AGC                   | —    |
| 29      | LVE    | VIDEO OUTPUT LEVEL       | —    |
| 30      | M00    | MODE 0                   | 34   |
| 31      | M01    | MODE 1                   | 09   |
| 32      | M02    | MODE 2                   | 03   |

\* Mark items should be adjusted.



## PICTURE I-F TRAP ALIGNMENT

GENERAL ..... Refer to figure 4 for the equipment connection.

PRELIMINARY STEPS ..... 1. Turn the power switch of TV set off.  
 2. Supply +12 volts to the PIF Board.  
 3. Turn RF AGC Control (R151) fully clockwise.

SWEEP/MARKER GENERATOR..... Connect to pin PL of P102 on the PIF Board as shown in figure 4.  
 Set the signal level to 80dB $\mu$ V.

OSCILLOSCOPE..... Connect through the detector (See figure 6.) to the emitter of Q103.

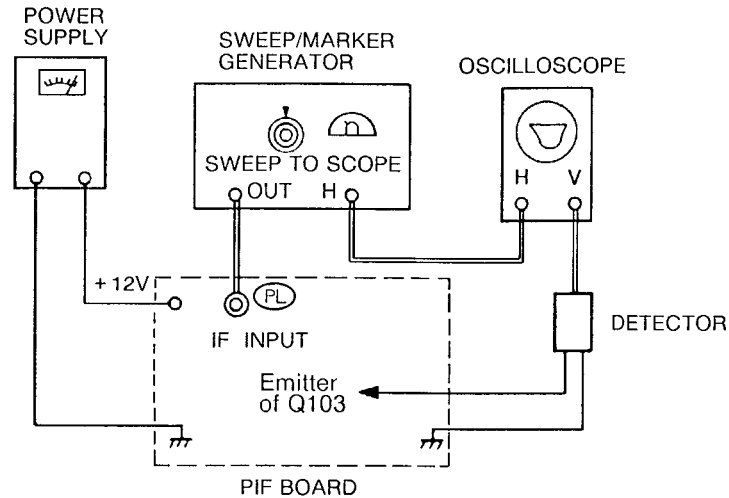


Figure 4.

| STEP   | SWEEP/MARKER GENERATOR | ADJUST | PROCEDURE  |
|--|------------------------|--------|--|
| <b>TRAP ALIGNMENT</b><br>Control the sweep output for easy alignment. Set the IF makers for 40.4MHz and 31.9MHz. |                        |        |  |
| Trap coil TN01   | 40.4MHz Marker "ON"    | TN01   | Short the pin PL of P101 to ground. Adjust TN01 so the 40.4MHz marker point is placed at bottom of response. (See figure 5.)     |
| Trap coil TN02   | 31.9MHz Marker "ON"    | TN02   | Short the pin PL of P101 to ground, and adjust TN02 so the 31.9MHz marker point is placed at bottom of response. (See figure 5.) |



Figure 5. Trap Response

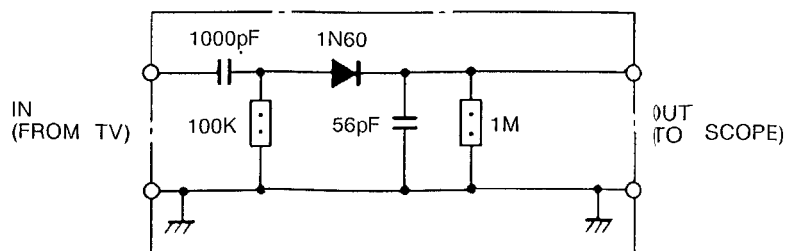


Figure 6. Detector Diagram



## PICTURE I-F SWEEP ALIGNMENT

GENERAL ..... Refer to figure 7 for test equipment connection.

PRELIMINARY STEPS ..... 1. Supply +12 volts to the PIF Board.  
2. Supply dc 4~5V to pin 4 of IC101.  
3. Connect pin 16 of IC101 to ground through capacitor 10  $\mu$ F.

SWEEP/MARKER GENERATOR..... Connect to pin PL of PIF Board as shown in figure 7.  
Set to 30 ~ 40 MHz sweep with signal level of 75 ~ 85 dB $\mu$ .

OSCILLOSCOPE ..... Connect through the detector to pin 19 of IC101 on the IF Board.

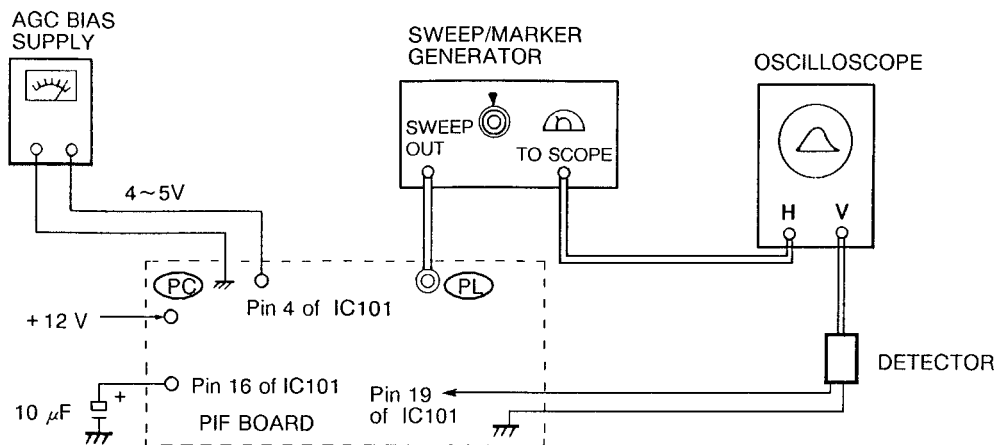
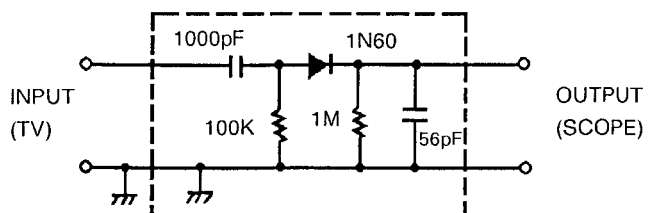


Figure 7. Picture IF Sweep Alignment

| STEP   | SWEEP/MARKER GENERATOR | ADJUST | REMARKS  |
|--|------------------------|--------|--|
| 38.9MHz VCO Coil   | 38.9 MHz Marker "ON"   | L151   | <ul style="list-style-type: none"> <li>Adjust L151 so that the marker (38.9 MHz) on the response can get zero beat with free-run frequency. (See figure 8.)</li> <li>Remove the capacitor 10<math>\mu</math>F on pin 16 of IC101.</li> </ul> |
| After completing the above step, disconnect the equipment and re-solder the solder links, and adjust the RF AGC control (R151) following RF AGC ADJUSTMENTS. |                        |        |  |



Figure 8. Magnified Response Curve



Detector Diagram



## AFC ALIGNMENT

GENERAL ..... Refer to figure 9 for test equipment connection.  
 PRELIMINARY STEPS ..... 1. Supply +12 volts to the PIF Board.  
 DVM ..... Connect to the pin PF of P101 on PIF Board and ground.

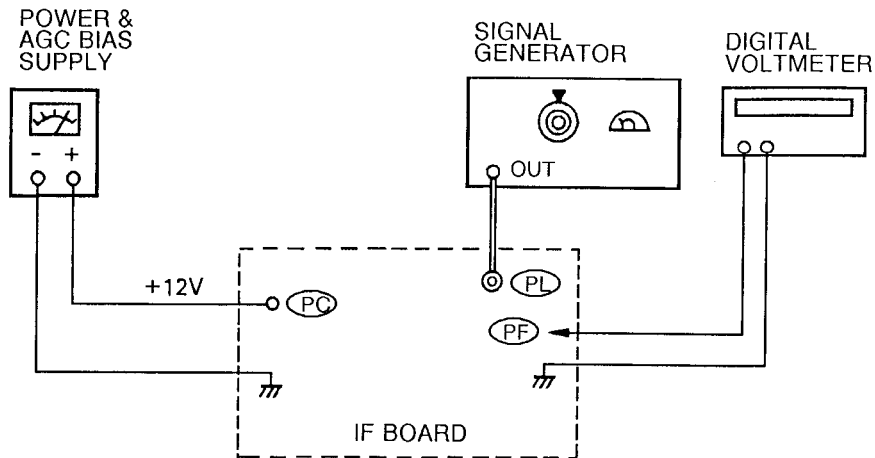


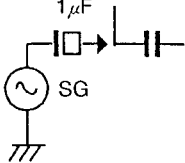
Figure 9. AFC Alignment

| STEP                  | SIGNAL GENERATOR                                   | ADJUST | REMARKS  |
|-----------------------|--|--------|--|
| 1. AFC Balance (R153) | NO SIGNAL  | R153   | <ul style="list-style-type: none"> <li>Connect pin 4 of IC101 to ground.</li> <li>Connect DVM to pin PF of P101 on PIF Board.</li> <li>Adjust R153 for 4.5 volts reading on meter.</li> </ul>  |
| 2. AFC Coil (L152)    | 38.9 MHz CARRIER WAVE (Level : 75 to 85 dB $\mu$ ) | L153   | <ul style="list-style-type: none"> <li>Remove the short of pin 4 of IC101.</li> <li>Apply +12 V to pin PC of P101.</li> <li>Connect IF carrier wave to the pin PF of P101.</li> <li>Connect DVM to pin PF of P102.</li> <li>Adjust L152 for 4.3 volts on the meter.</li> </ul> |



## SIF & MPX (IGR) ALIGNMENT

■ Supply +12V to pin SN of PG02 on IGR Board.

| STEP | ADJUSTING PARTS               | INPUT TERMINAL  | OUTPUT TERMINAL  | TEST SIGNAL   | PROCEDURE  |
|------|-------------------------------|---|------------------|---|--|
| 1.   | 54.7 kHz PILOT ADJ.<br>(LG01) | CG45<br> | Pin 5<br>(ICG01) | Pilot Signal<br>Input level: 100mVp-p<br>f = 54.69 kHz  | 1. Connect the signal to CG45.<br>2. Connect oscilloscope to pin 5 of ICG01.<br>3. Adjust LG01 for the maximum amplitude of 54.69 kHz element. |
| 2.   | STEREO SEPARATION<br>(RG50)   | Aerial  | PIN SA<br>(PG01) | ON AIR SIGNAL<br>S1: fm = 1 kHz<br>Δf = ± 15 kHz<br>S2: fm = 1 kHz<br>Δf = ± 30 kHz<br>LEFT CH.: No modulation<br>Input level: 100dBμ | 1. Receive ON-AIR stereo signal.<br>2. Connect oscilloscope to pin SA of PG02.<br>3. Adjust RG50 for the minimum amplitude of 1 kHz element.   |



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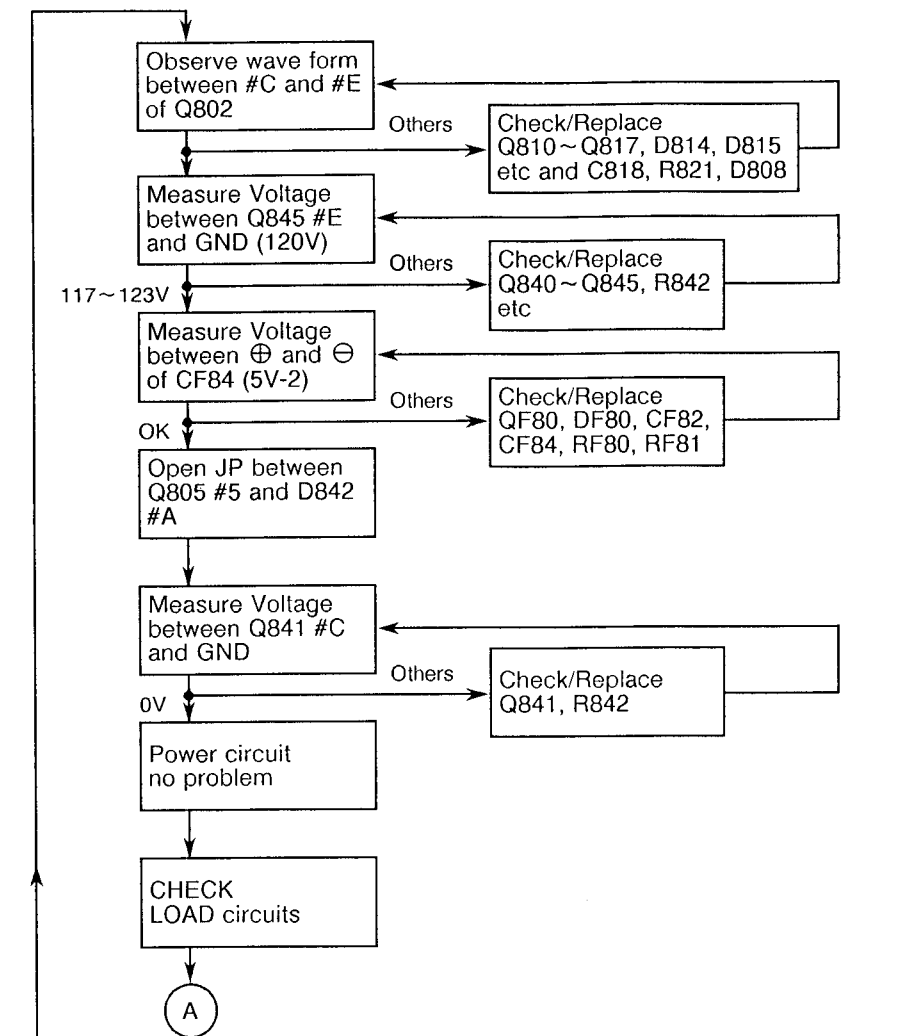
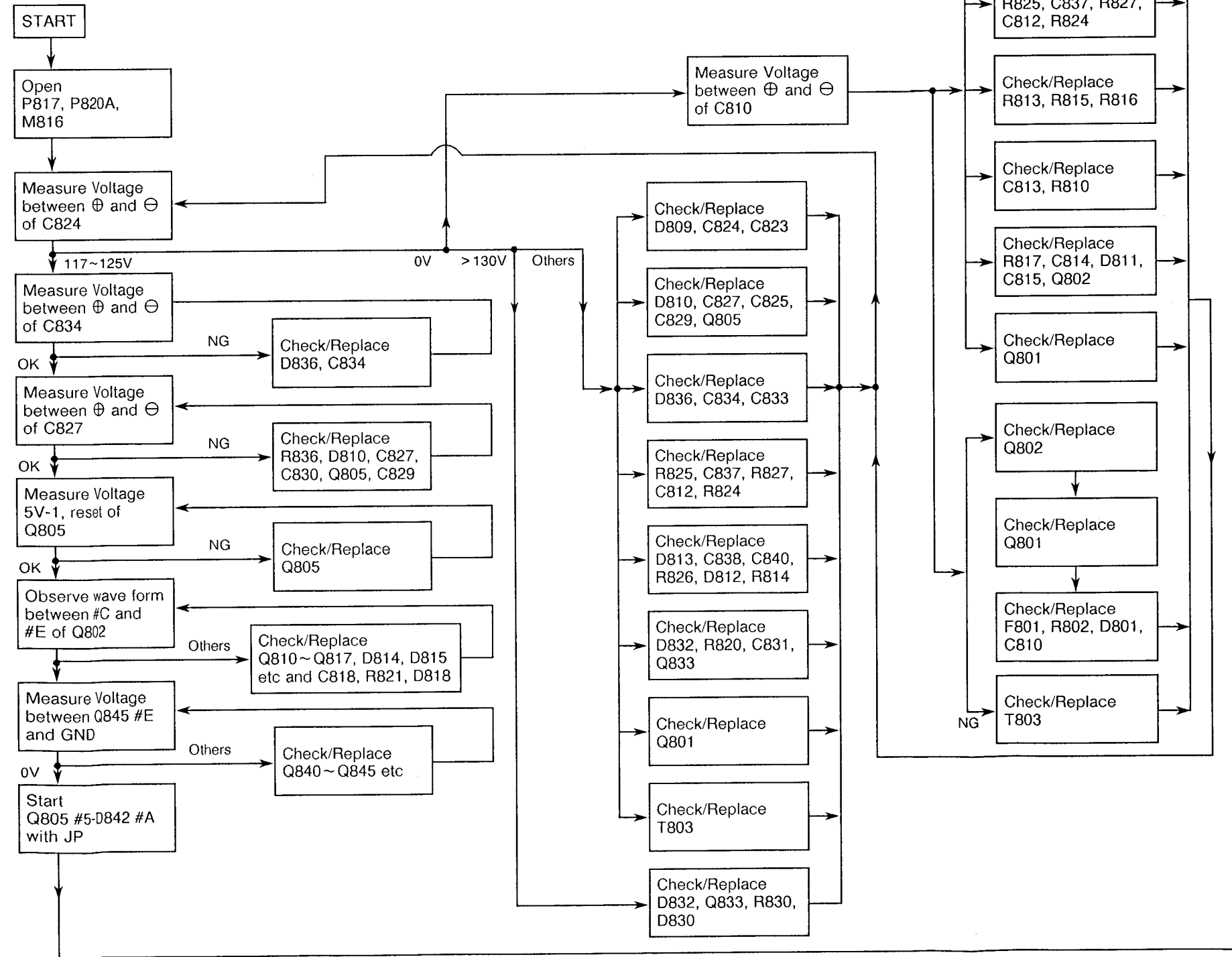


## TROUBLESHOOTING CHARTS

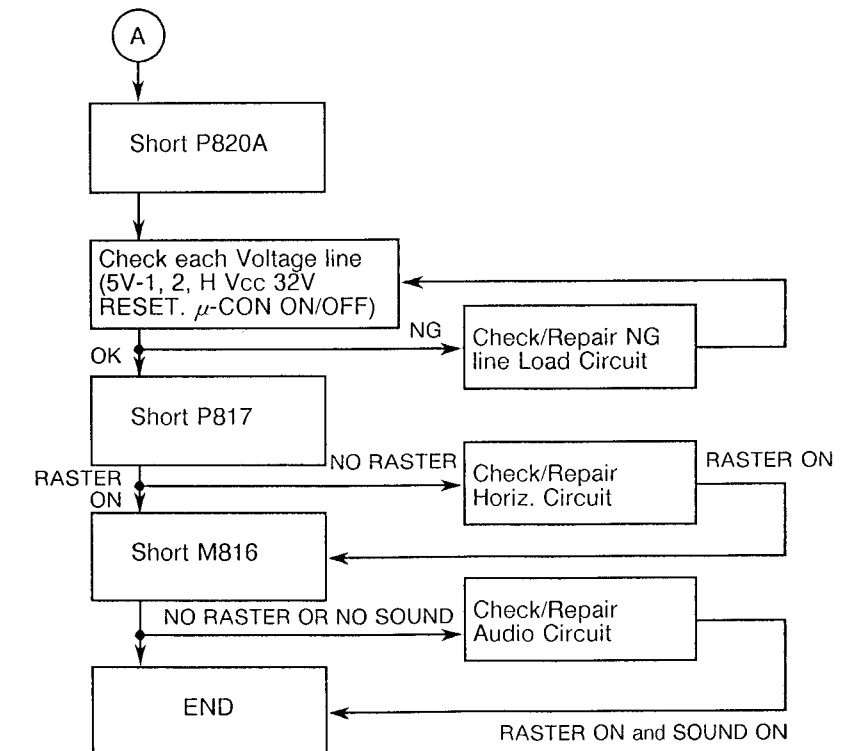
The following charts are devoted to troubleshooting which, if followed carefully, will assist you in tracking down a fault to the correct stage.  
In order to utilize the charts (fault trees), firstly establish the complaint, i.e. – No Raster, No Sound.  
Locate the chart applicable and then progress through the various alternatives until a final block indicates the offending components or stage.

### 1. NO RASTER AND NO SOUND

#### (a) CHECK/REPAIR POWER CIRCUIT

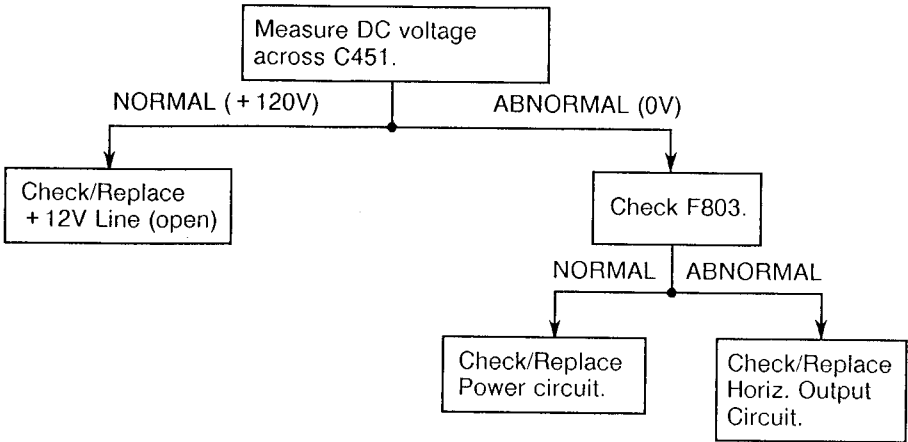


#### (b) CHECK/REPAIR LOAD CIRCUITS

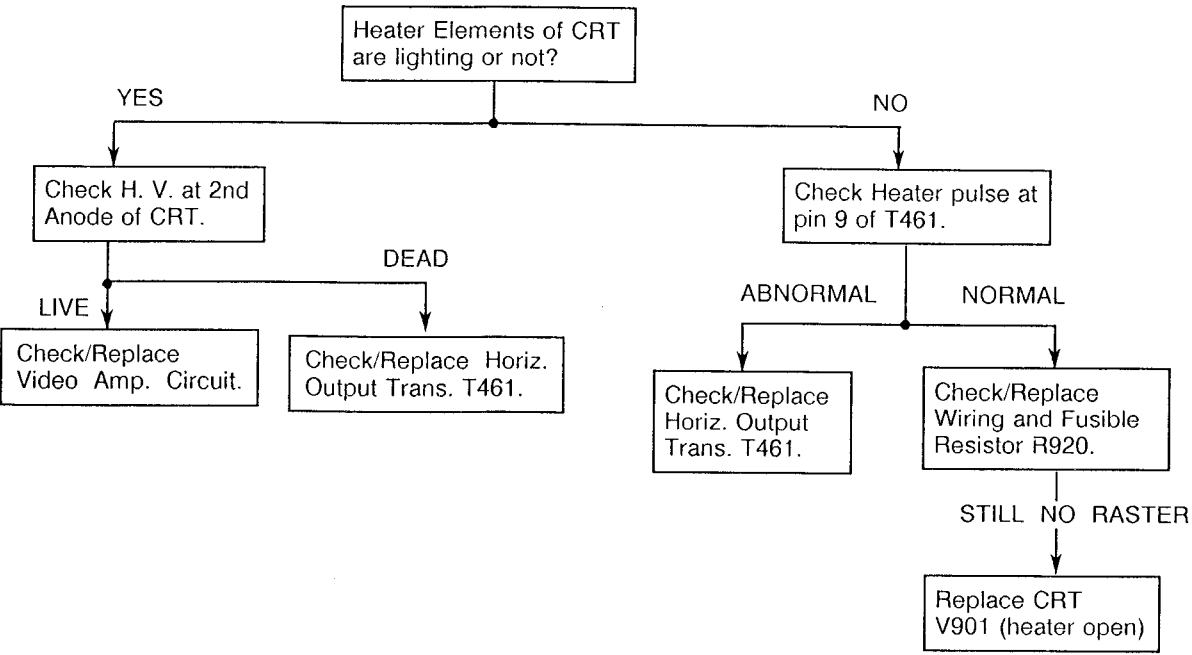




2. NO RASTER (NOISE OR WEAK SOUND)

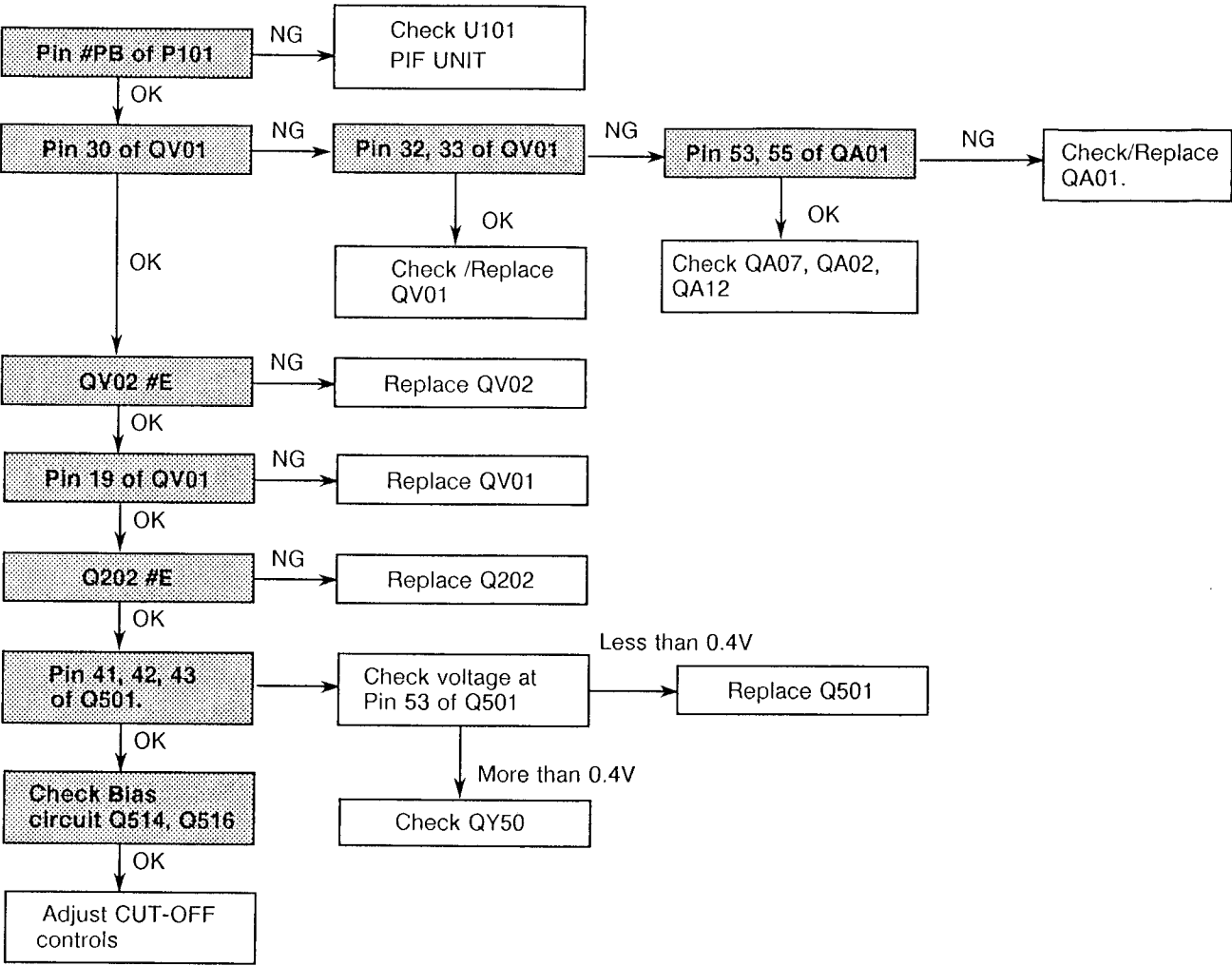


3. NO RASTER (SOUND OK)



4. NO PICTURE

Check video signal waveform for shaded area below.

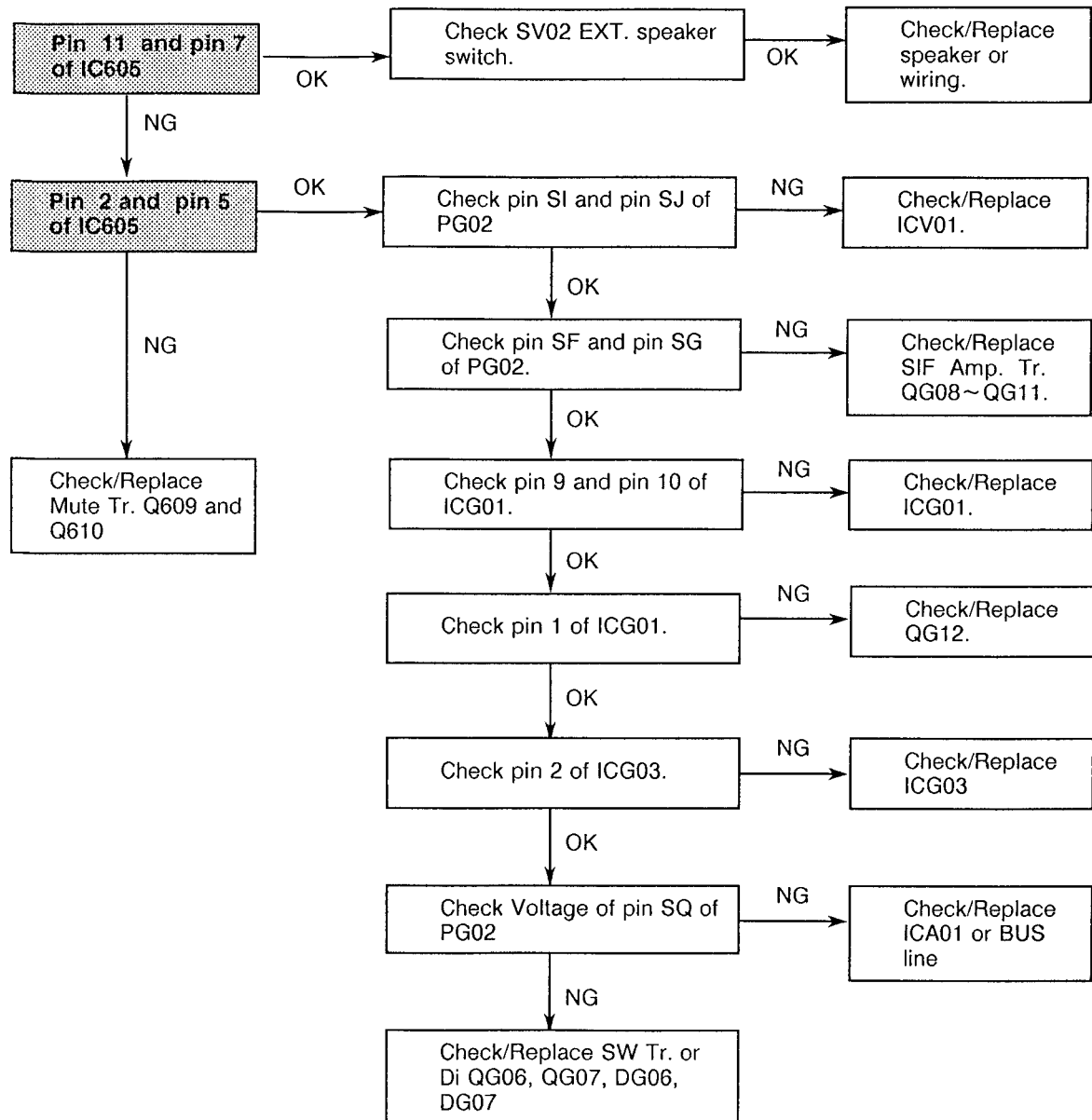




## 5. NO SOUND

**Note:** Check the sound signal waveform for shaded area below.

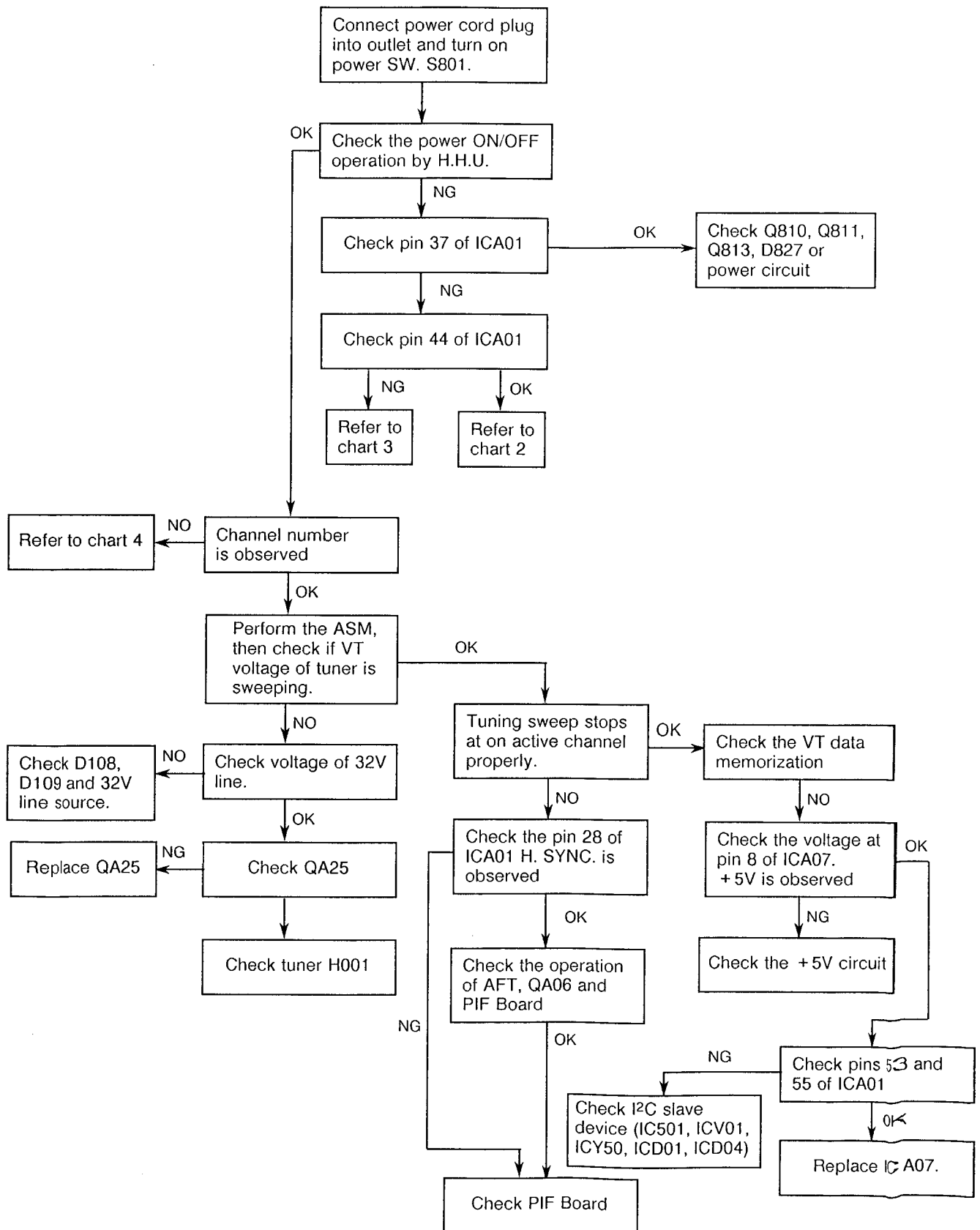
**CONDITION : VOLUME MAX.**





## 6. CHANNEL SELECTOR TROUBLE

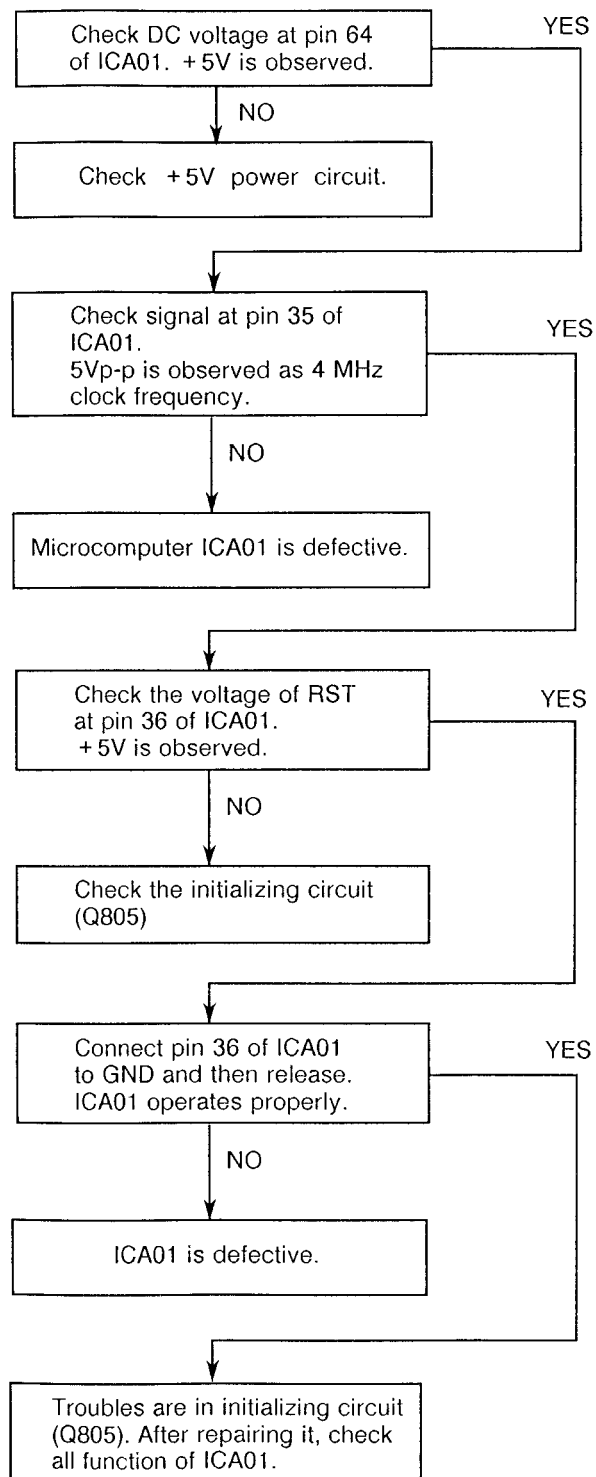
[CHART 1]





**[CHART 2] Microcomputer (ICA01) Operation Check**

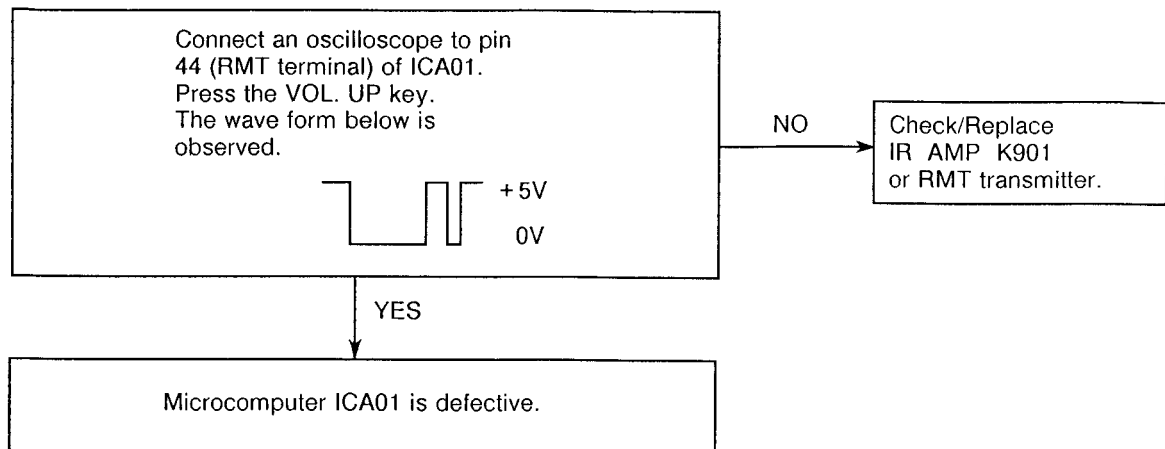
**Note:** Before checking Microcomputer, check that control buttons and their connection work properly.



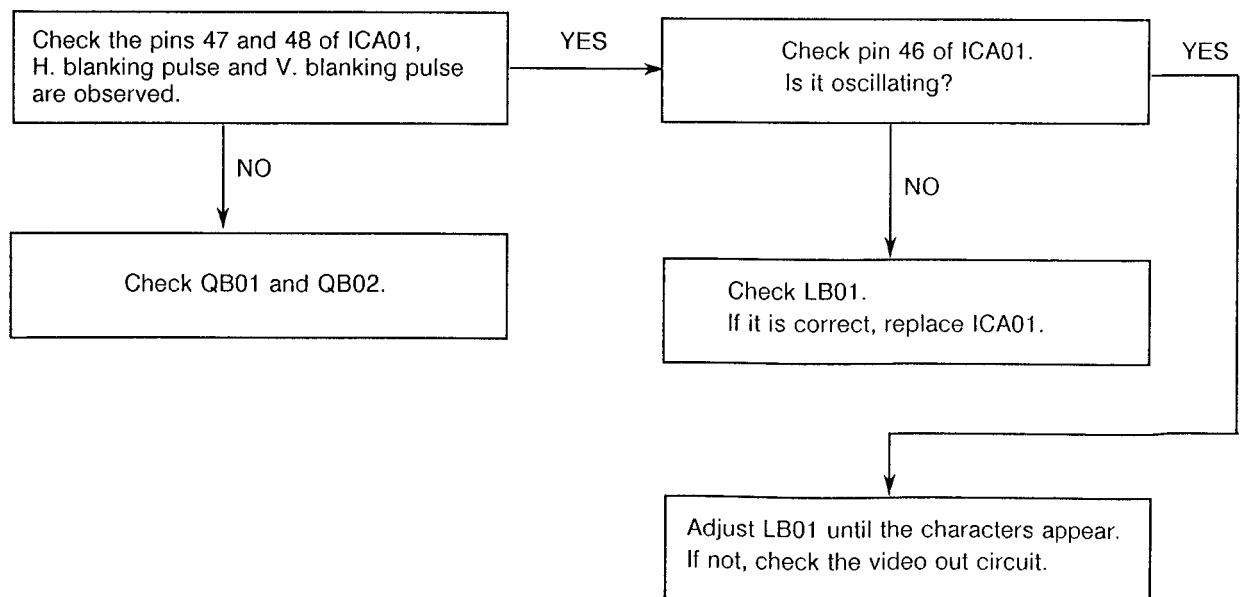


### [CHART 3] Remote Control Operation Check

**Note :** Before checking RMT operation, check that key operation on TV set is proper.

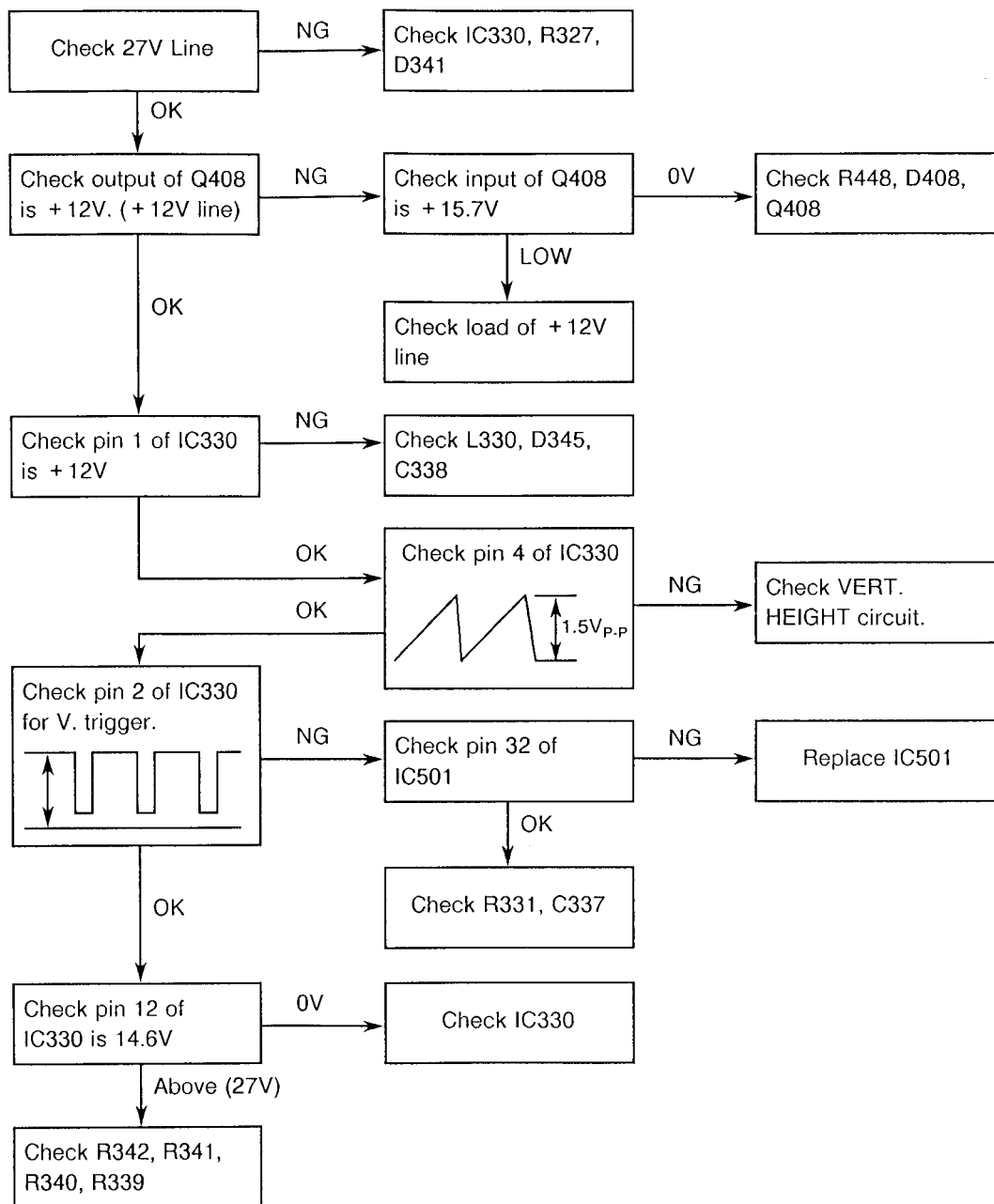


### [CHART 4] On Screen Display Operation Check





## 7. NO VERT. SCAN (ONE HORIZ. LINE RASTER)



## 8. OUT OF VERT. SYNC. AND HORIZ. SYNC.

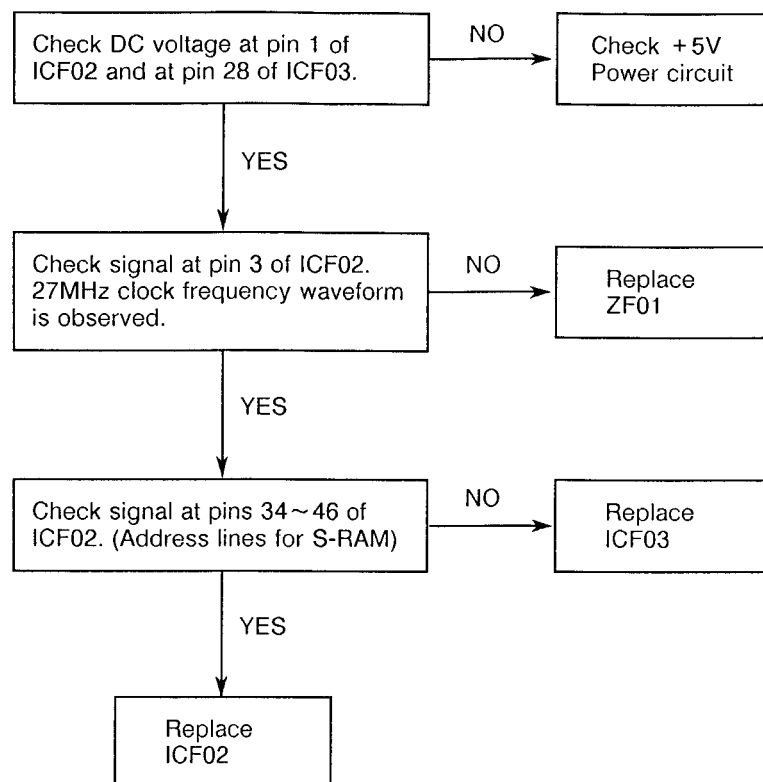
Check/Replace Sync Circuit (pin 33 of IC501) and IC501.

## 9. OUT OF HORIZ. SYNC.

Check/Replace IC501.

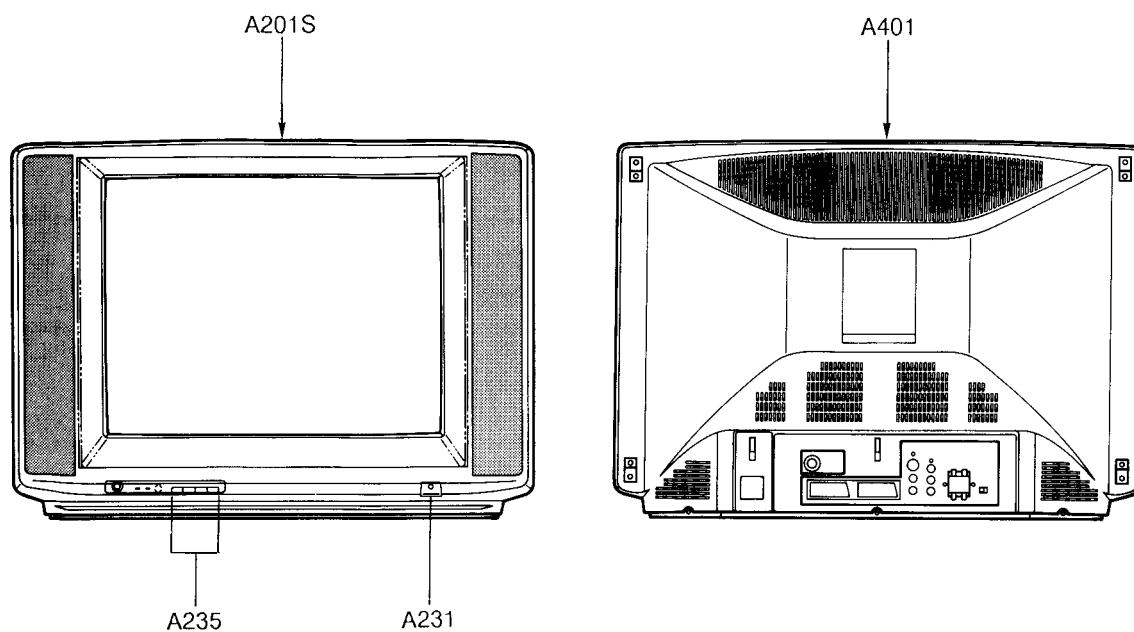


## 10. TELETEXT OPERATION TROUBLE





## CABINET REPLACEMENT PARTS LIST



| Location No. | Part No. | Description        |
|--------------|----------|--------------------|
| A201S        | 23418975 | Front Cover        |
| A231         | 23443553 | Button, POWER      |
| A235         | 23443552 | Button, UP-DOWN    |
| A401         | 23424156 | Back Cover         |
| A411         | 23567859 | Label, Model No.   |
| A412         | 23995762 | Label, TUB(On B/C) |
| A701         | 23523564 | Carton Box         |
| A702         | 23934005 | Packing, Bottom    |
| A703         | 23934899 | Packing, Top       |
| A710         | 23567858 | Label              |
| B202         | 23443043 | Knob, Sub          |
| Y101         | 23561116 | Owner's Manual     |



## CHASSIS REPLACEMENT PARTS LIST

**WARNING:** BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

**CAUTION:** The international hazard symbols in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

**NOTICE:** *The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.*

### ABBREVIATIONS:

|                 |                        |                         |                       |
|-----------------|------------------------|-------------------------|-----------------------|
| Capacitors..... | CD : Ceramic Disk      | PF : Plastic Film       | EL : Electrolytic     |
| Resistors.....  | CF : Carbon Film       | CC : Carbon Composition | MF : Metal Film       |
|                 | OMF : Oxide Metal Film | VR : Variable Resistor  | FR : Fusible Resistor |

(All CD and PF capacitors are  $\pm 5\%$ , 50V and all resistors,  $\pm 5\%$ , 1/6W unless otherwise noted.)

| Location No.      | Part No. | Description                        |
|-------------------|----------|------------------------------------|
| <b>CAPACITORS</b> |          |                                    |
| C101              | 24815102 | Chip, 1000pF, $\pm 10\%$           |
| C102              | 24815102 | Chip, 1000pF, $\pm 10\%$           |
| C104              | 24206478 | EL, 0.47 $\mu$ F, 50V              |
| C105              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C106              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C107              | 24781221 | Chip, 220pF                        |
| C108              | 24206478 | EL, 0.47 $\mu$ F, 50V              |
| C109              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C110              | 24203470 | EL, 47 $\mu$ F, $\pm 20\%$ , 16V   |
| C111              | 24815102 | Chip, 1000pF, $\pm 10\%$           |
| C112              | 24815102 | Chip, 1000pF, $\pm 10\%$           |
| C114              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C116              | 24206010 | EL, 1 $\mu$ F, 50V                 |
| C117              | 24778181 | Chip, 180pF                        |
| C118              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C119              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C120              | 24794331 | EL, 330 $\mu$ F, 16V               |
| C121              | 24794221 | EL, 220 $\mu$ F, 16V               |
| C122              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C123              | 24815102 | Chip, 1000pF, $\pm 10\%$           |
| C124              | 24203470 | EL, 47 $\mu$ F, $\pm 20\%$ , 16V   |
| C125              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C170              | 24781120 | Chip, 12pF                         |
| C171              | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%     |
| C180              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C181              | 24794471 | EL, 470 $\mu$ F, $\pm 20\%$ , 16V  |
| C182              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C183              | 24206229 | EL, 2.2 $\mu$ F, 50V               |
| C184              | 24206229 | EL, 2.2 $\mu$ F, 50V               |
| C185              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C186              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C187              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C188              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C189              | 24797229 | EL, 2.2 $\mu$ F, $\pm 20\%$ , 50V  |
| C190              | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%       |
| C191              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C201              | 24085981 | EL, 10 $\mu$ F, $\pm 20\%$ , 16V   |
| C202              | 24795101 | EL, 100 $\mu$ F, 25V               |
| C203              | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V |
| C204              | 24206220 | EL, 22 $\mu$ F, 50V                |

| Location No. | Part No. | Description                          |
|--------------|----------|--------------------------------------|
| C205         | 24797478 | EL, 0.47 $\mu$ F, $\pm 20\%$ , 50V   |
| C208         | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V   |
| C209         | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V   |
| C210         | 24473220 | CD, 22pF                             |
| C212         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%         |
| C213         | 24474103 | CD, 0.01 $\mu$ F, $\pm 30\%$ , 16V   |
| C220         | 24473300 | CD, 30pF                             |
| C240         | 24797478 | EL, 0.47 $\mu$ F, $\pm 20\%$ , 50V   |
| C301         | 24797229 | EL, 2.2 $\mu$ F, $\pm 20\%$ , 50V    |
| C302         | 24212152 | CD, 1500pF, $\pm 10\%$               |
| C314         | 24796102 | EL, 1000 $\mu$ F, 35V                |
| C315         | 24214221 | CD, 220pF, $\pm 10\%$ , 500V         |
| C330         | 24590103 | PF, 0.01 $\mu$ F                     |
| C331         | 24617915 | EL, 1 $\mu$ F, $\pm 10\%$ , 50V      |
| C332         | 24796221 | EL, 220 $\mu$ F, $\pm 20\%$ , 35V    |
| C333         | 24796101 | EL, 100 $\mu$ F, 35V                 |
| C334         | 24082057 | PF, 0.22 $\mu$ F, 100V               |
| C335         | 24795332 | EL, 3300 $\mu$ F, 25V                |
| C336         | 24617915 | EL, 1 $\mu$ F, $\pm 10\%$ , 50V      |
| C337         | 24474102 | CD, 1000pF, $\pm 10\%$               |
| C338         | 24794470 | EL, 47 $\mu$ F, $\pm 20\%$ , 16V     |
| C339         | 24590104 | PF, 0.1 $\mu$ F                      |
| C340         | 24435100 | CD, 10pF                             |
| C402         | 24353241 | CD, 240pF                            |
| C403         | 24797339 | EL, 3.3 $\mu$ F, $\pm 20\%$ , 50V    |
| C405         | 24590203 | PF, 0.02 $\mu$ F                     |
| C406         | 24590153 | PF, 0.015 $\mu$ F                    |
| C407         | 24590243 | PF, 0.024 $\mu$ F                    |
| C408         | 24797100 | EL, 10 $\mu$ F, $\pm 20\%$ , 50V     |
| C409         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%         |
| C410         | 24693272 | PF, 2700pF, 100V                     |
| C414         | 24212221 | CD, 220pF, $\pm 10\%$                |
| C416         | 24214271 | CD, 270pF, $\pm 10\%$ , 500V         |
| △ C440       | 24095889 | PF, 9100pF, $\pm 3\%$ , 1600V        |
| C441         | 24214221 | CD, 220pF, $\pm 10\%$ , 500V         |
| C443         | 24214221 | CD, 220pF, $\pm 10\%$ , 500V         |
| C444         | 24092339 | CD, 330pF, $\pm 10\%$ , 2kV          |
| C445         | 24095903 | PF, 0.056 $\mu$ F, $\pm 10\%$ , 250V |
| C447         | 24700479 | EL, 4.7 $\mu$ F, $\pm 20\%$ , 50V    |
| C448         | 24667102 | EL, 1000 $\mu$ F, $\pm 20\%$ , 25V   |
| C449         | 24666471 | EL, 470 $\mu$ F, $\pm 20\%$ , 16V    |



| Location No. | Part No. | Description                                   |
|--------------|----------|---|
| C451         | 24640908 | EL, 33 $\mu$ F, $\pm$ 20%, 160V               |
| △ C463       | 24212222 | CD, 2200pF, $\pm$ 10%                         |
| C465         | 24095759 | PF, 0.39 $\mu$ F, 200V                        |
| C501         | 24797220 | EL, 22 $\mu$ F, $\pm$ 20%, 50V                |
| C504         | 24474181 | CD, 180pF, $\pm$ 10%                          |
| C505         | 24590273 | PF, 0.027 $\mu$ F                             |
| C507         | 24590103 | PF, 0.01 $\mu$ F                              |
| C508         | 24085944 | EL, 2.2 $\mu$ F, $\pm$ 20%, 50V,<br>Non-Polar |
| C510         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V              |
| C511         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V              |
| C513         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%                  |
| C514         | 24474181 | CD, 180pF, $\pm$ 10%                          |
| C515         | 24797220 | EL, 22 $\mu$ F, $\pm$ 20%, 50V                |
| C516         | 24590104 | PF, 0.1 $\mu$ F                               |
| C517         | 24590104 | PF, 0.1 $\mu$ F                               |
| C518         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V              |
| C519         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V              |
| C520         | 24797478 | EL, 0.47 $\mu$ F, $\pm$ 20%, 50V              |
| C521         | 24538474 | PF, 0.47 $\mu$ F                              |
| C522         | 24538474 | PF, 0.47 $\mu$ F                              |
| C523         | 24538474 | PF, 0.47 $\mu$ F                              |
| C524         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V              |
| C525         | 24436270 | CD, 27pF                                      |
| C526         | 24436270 | CD, 27pF                                      |
| C527         | 24436270 | CD, 27pF                                      |
| C528         | 24474102 | CD, 1000pF, $\pm$ 10%                         |
| C529         | 24473150 | CD, 15pF                                      |
| C530         | 24796220 | EL, 22 $\mu$ F, $\pm$ 20%, 35V                |
| C531         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V                |
| C532         | 24436101 | CD, 100pF                                     |
| C533         | 24436101 | CD, 100pF                                     |
| C534         | 24436101 | CD, 100pF                                     |
| C535         | 24636100 | EL, 10 $\mu$ F, 50V                           |
| C536         | 24636478 | EL, 0.47 $\mu$ F, 50V                         |
| C537         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V               |
| C538         | 24353200 | CD, 20pF                                      |
| C539         | 24353330 | CD, 33pF                                      |
| C540         | 24436221 | CD, 220pF                                     |
| C541         | 24436221 | CD, 220pF                                     |
| C542         | 24436221 | CD, 220pF                                     |
| C543         | 24794220 | EL, 22 $\mu$ F, $\pm$ 20%, 16V                |
| C603         | 24287103 | Chip, 0.01 $\mu$ F, +80%, -20%                |
| C606         | 24203330 | EL, 33 $\mu$ F, $\pm$ 20%, 16V                |
| C607         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%                |
| C620         | 24795102 | EL, 1000 $\mu$ F, $\pm$ 20%, 25V              |
| C621         | 24795102 | EL, 1000 $\mu$ F, $\pm$ 20%, 25V              |
| C622         | 24795101 | EL, 100 $\mu$ F, 25V                          |
| C623         | 24538184 | PF, 0.18 $\mu$ F                              |
| C624         | 24590104 | PF, 0.1 $\mu$ F                               |
| C625         | 24538184 | PF, 0.18 $\mu$ F                              |
| C633         | 24590562 | PF, 5600pF                                    |
| C635         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V               |
| C636         | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V                 |
| C638         | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V                 |
| C639         | 24795101 | EL, 100 $\mu$ F, 25V                          |
| C640         | 24590562 | PF, 5600pF                                    |
| C642         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V               |
| C643         | 24590104 | PF, 0.1 $\mu$ F                               |
| C644         | 24797471 | EL, 470 $\mu$ F, $\pm$ 20%, 50V               |
| C645         | 24590104 | PF, 0.1 $\mu$ F                               |
| C646         | 24436101 | CD, 100pF                                     |
| C647         | 24436101 | CD, 100pF                                     |
| △ C801       | 24098999 | PF, 0.1 $\mu$ F, $\pm$ 20%, AC250V            |

| Location No. | Part No. | Description                        |
|--------------|----------|------------------------------------|
| △ C802       | 24098999 | PF, 0.1 $\mu$ F, $\pm$ 20%, AC250V |
| C803         | 24092281 | CD, 4700pF, $\pm$ 20%, AC250V      |
| C804         | 24092281 | CD, 4700pF, $\pm$ 20%, AC250V      |
| C805         | 24092281 | CD, 4700pF, $\pm$ 20%, AC250V      |
| C806         | 24092281 | CD, 4700pF, $\pm$ 20%, AC250V      |
| C810         | 24086856 | EL, 270 $\mu$ F, $\pm$ 20%, 400V   |
| C811         | 24436101 | CD, 100pF                          |
| C812         | 24436561 | CD, 560pF                          |
| C813         | 24590682 | PF, 6800pF                         |
| C814         | 24630747 | EL, 22 $\mu$ F, $\pm$ 20%, 25V     |
| C815         | 24212102 | CD, 1000pF, $\pm$ 10%              |
| C816         | 24092339 | CD, 330pF, $\pm$ 10%, 2kV          |
| C818         | 24095931 | PF, 2200pF, 1600V                  |
| C820         | 24797101 | EL, 100 $\mu$ F, $\pm$ 20%, 50V    |
| C821         | 24436331 | CD, 330pF                          |
| C823         | 24092336 | CD, 180pF, $\pm$ 10%, 2kV          |
| C824         | 24086953 | EL, 220 $\mu$ F, $\pm$ 20%, 160V   |
| C825         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%       |
| C827         | 24795102 | EL, 1000 $\mu$ F, $\pm$ 20%, 25V   |
| C829         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V     |
| C830         | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V      |
| C831         | 24709479 | EL, 4.7 $\mu$ F, $\pm$ 20%, 200V   |
| C833         | 24214331 | CD, 330pF, $\pm$ 10%, 500V         |
| C834         | 24797222 | EL, 2200 $\mu$ F, $\pm$ 20%, 50V   |
| C835         | 24436101 | CD, 100pF                          |
| C837         | 24590103 | PF, 0.01 $\mu$ F                   |
| C838         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V     |
| C839         | 24538474 | PF, 0.47 $\mu$ F                   |
| C840         | 24538474 | PF, 0.47 $\mu$ F                   |
| C845         | 24666101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V    |
| C861         | 24762471 | EL, 470 $\mu$ F, $\pm$ 20%, 10V    |
| C881         | 24094656 | CD, 2200pF, $\pm$ 20%, AC400V      |
| C882         | 24094656 | CD, 2200pF, $\pm$ 20%, AC400V      |
| C885         | 24598102 | PF, 1000pF                         |
| C886         | 24436101 | CD, 100pF                          |
| C887         | 24794470 | EL, 47 $\mu$ F, $\pm$ 20%, 16V     |
| C901         | 24700479 | EL, 4.7 $\mu$ F, $\pm$ 20%, 250V   |
| C902         | 24095923 | PF, 4700pF, 1600V                  |
| CA11         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V     |
| CA12         | 24794102 | EL, 1000 $\mu$ F, 16V              |
| CA13         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V     |
| CA14         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%       |
| CA15         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V   |
| CA16         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V     |
| CA29         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%       |
| CA31         | 24436300 | CD, 30pF                           |
| CA32         | 24436300 | CD, 30pF                           |
| CA33         | 24474102 | CD, 1000pF, $\pm$ 10%              |
| CA36         | 24590104 | PF, 0.1 $\mu$ F                    |
| CA39         | 24474391 | CD, 390pF, $\pm$ 10%               |
| CA40         | 24474221 | CD, 220pF, $\pm$ 10%               |
| CA41         | 24590104 | PF, 0.1 $\mu$ F                    |
| CA42         | 24590563 | PF, 0.056 $\mu$ F                  |
| CA43         | 24590563 | PF, 0.056 $\mu$ F                  |
| CA70         | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V      |
| CA71         | 24212102 | CD, 1000pF, $\pm$ 10%              |
| CA72         | 24212472 | CD, 4700pF, $\pm$ 10%              |
| CA75         | 24436561 | CD, 560pF                          |
| CA76         | 24794330 | EL, 33 $\mu$ F, $\pm$ 20%, 16V     |
| CA77         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%       |
| CA78         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V     |
| CA98         | 24797229 | EL, 2.2 $\mu$ F, $\pm$ 20%, 50V    |
| CA99         | 24590104 | PF, 0.1 $\mu$ F                    |
| CB01         | 24212101 | CD, 100pF, $\pm$ 10%               |



| Location No. | Part No. | Description                                |
|--------------|----------|--|
| CF01         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%               |
| CF02         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V             |
| CF03         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V           |
| CF04         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V             |
| CF05         | 24353220 | CD, 22pF                                   |
| CF06         | 24353220 | CD, 22pF                                   |
| CF07         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%               |
| CF08         | 24590104 | PF, 0.1 $\mu$ F                            |
| CF09         | 24085944 | EL, 2.2 $\mu$ F, $\pm$ 20%, 50V, Non-Polar |
| CF10         | 24206100 | EL, 10 $\mu$ F, 50V                        |
| CF11         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V           |
| CF15         | 24794470 | EL, 47 $\mu$ F, $\pm$ 20%, 16V             |
| CF16         | 24353220 | CD, 22pF                                   |
| CF17         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V             |
| CF18         | 24590103 | PF, 0.01 $\mu$ F                           |
| CF19         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V            |
| CF20         | 24436220 | CD, 22pF                                   |
| CF82         | 24795221 | EL, 220 $\mu$ F, $\pm$ 20%, 25V            |
| CF84         | 24794470 | EL, 47 $\mu$ F, $\pm$ 20%, 16V             |
| CG03         | 24781470 | Chip, 47pF                                 |
| CG05         | 24287103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG06         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG07         | 24276160 | Chip, 16pF                                 |
| CG08         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG09         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG10         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG11         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG12         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG13         | 24203220 | EL, 22 $\mu$ F, $\pm$ 20%, 16V             |
| CG14         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG15         | 24774510 | Chip, 51pF                                 |
| CG16         | 24783220 | Chip, 22pF                                 |
| CG17         | 24781201 | Chip, 200pF                                |
| CG18         | 24774150 | Chip, 15pF                                 |
| CG19         | 24287103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG20         | 24206010 | EL, 1 $\mu$ F, 50V                         |
| CG21         | 24206010 | EL, 1 $\mu$ F, 50V                         |
| CG22         | 24590152 | PF, 1500pF                                 |
| CG23         | 24590152 | PF, 1500pF                                 |
| CG24         | 24794471 | EL, 470 $\mu$ F, $\pm$ 20%, 16V            |
| CG25         | 24206229 | EL, 2.2 $\mu$ F, 50V                       |
| CG26         | 24206229 | EL, 2.2 $\mu$ F, 50V                       |
| CG27         | 24590332 | PF, 3300pF                                 |
| CG28         | 24436681 | CD, 680pF                                  |
| CG29         | 24590104 | PF, 0.1 $\mu$ F                            |
| CG30         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%             |
| CG31         | 24590104 | PF, 0.1 $\mu$ F                            |
| CG34         | 24590104 | PF, 0.1 $\mu$ F                            |
| CG35         | 24538474 | PF, 0.47 $\mu$ F                           |
| CG36         | 24538474 | PF, 0.47 $\mu$ F                           |
| CG37         | 24206010 | EL, 1 $\mu$ F, 50V                         |
| CG38         | 24206010 | EL, 1 $\mu$ F, 50V                         |
| CG39         | 24590153 | PF, 0.015 $\mu$ F                          |
| CG40         | 24590153 | PF, 0.015 $\mu$ F                          |
| CG41         | 24590473 | PF, 0.047 $\mu$ F                          |
| CG42         | 24590473 | PF, 0.047 $\mu$ F                          |
| CG43         | 24815103 | Chip, 0.01 $\mu$ F, $\pm$ 10%              |
| CG44         | 24590103 | PF, 0.01 $\mu$ F                           |
| CG45         | 24590102 | PF, 1000pF                                 |
| CG55         | 24093950 | Variable Capacitor, 5.5 to 30pF, 100V      |
| CG60         | 24794221 | EL, 220 $\mu$ F, 16V                       |
| CG80         | 24781201 | Chip, 200pF                                |

| Location No. | Part No. | Description                      |
|--------------|----------|----------------------------------|
| CG81         | 24783220 | Chip, 22pF                       |
| CG82         | 24774680 | Chip, 68pF                       |
| CG83         | 24774150 | Chip, 15pF                       |
| CG84         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%   |
| CG85         | 24203470 | EL, 47 $\mu$ F, $\pm$ 20%, 16V   |
| CG86         | 24814103 | Chip, 0.01 $\mu$ F, +80%, -20%   |
| CM01         | 24436201 | CD, 200pF                        |
| CM02         | 24436201 | CD, 200pF                        |
| CM05         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CM06         | 24357270 | CD, 27pF                         |
| CM07         | 24590563 | PF, 0.056 $\mu$ F                |
| CM08         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CM09         | 24357200 | CD, 20pF                         |
| CM10         | 24473270 | CD, 27pF                         |
| CM12         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CM14         | 24357200 | CD, 20pF                         |
| CN06         | 24474820 | CD, 82pF, $\pm$ 10%              |
| CN09         | 24353150 | CD, 15pF                         |
| CN10         | 24474101 | CD, 100pF, $\pm$ 10%             |
| CN12         | 24353300 | CD, 30pF                         |
| CN16         | 24590273 | PF, 0.027 $\mu$ F                |
| CN28         | 24473689 | CD, 6.8 $\mu$ F, $\pm$ 10%       |
| CN29         | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V    |
| CN30         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CV01         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CV02         | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV03         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV04         | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV05         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CV06         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV07         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V   |
| CV08         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV09         | 24474103 | CD, 0.01 $\mu$ F, $\pm$ 30%, 16V |
| CV10         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV11         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV12         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV13         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV14         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV15         | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV16         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV17         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV18         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV19         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV20         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV21         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV22         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV23         | 24793471 | EL, 470 $\mu$ F, $\pm$ 20%, 10V  |
| CV24         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V   |
| CV25         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV26         | 24793471 | EL, 470 $\mu$ F, $\pm$ 20%, 10V  |
| CV27         | 24206339 | EL, 3.3 $\mu$ F, 50V             |
| CV29         | 24590104 | PF, 0.1 $\mu$ F                  |
| CV30         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV31         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV32         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV33         | 24474102 | CD, 1000pF, $\pm$ 10%            |
| CV36         | 24797100 | EL, 10 $\mu$ F, $\pm$ 20%, 50V   |
| CV37         | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V   |
| CV38         | 24203101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V  |
| CV39         | 24276100 | Chip, 10pF                       |
| CV47         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V  |
| CV51         | 24203101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V  |
| CV70         | 24794101 | EL, 100 $\mu$ F, $\pm$ 20%, 16V  |
| CV71         | 24232103 | CD, 0.01 $\mu$ F, +80%, -20%     |



| Location No.     | Part No. | Description                     |
|------------------|----------|---------------------------------|
| CV72             | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V  |
| CV73             | 24474820 | CD, 82pF, $\pm$ 10%             |
| CV82             | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V  |
| CV83             | 24794100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V  |
| CV85             | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V  |
| CV86             | 24203100 | EL, 10 $\mu$ F, $\pm$ 20%, 16V  |
| CV96             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CV97             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CV98             | 24590562 | PF, 5600pF                      |
| CV99             | 24590562 | PF, 5600pF                      |
| CX02             | 24538474 | PF, 0.47 $\mu$ F                |
| CX03             | 24538474 | PF, 0.47 $\mu$ F                |
| CX04             | 24538474 | PF, 0.47 $\mu$ F                |
| CY51             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY52             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY53             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY54             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY55             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY56             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY57             | 24206010 | EL, 1 $\mu$ F, 50V              |
| CY58             | 24206010 | EL, 1 $\mu$ F, 50V              |
| CY59             | 24206010 | EL, 1 $\mu$ F, 50V              |
| CY60             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY61             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY62             | 24797010 | EL, 1 $\mu$ F, $\pm$ 20%, 50V   |
| CY63             | 24793221 | EL, 220 $\mu$ F, $\pm$ 20%, 10V |
| CY64             | 24590104 | PF, 0.1 $\mu$ F                 |
| <b>RESISTORS</b> |          |                                 |
| R101             | 24872122 | Chip, 1200 ohm, 1/16W           |
| R102             | 24871100 | Chip, 10 ohm, 1/8W              |
| R103             | 24872824 | Chip, 820k ohm, 1/16W           |
| R104             | 24872102 | Chip, 1000 ohm, 1/16W           |
| R105             | 24872104 | Chip, 100k ohm, 1/16W           |
| R106             | 24872682 | Chip, 6800 ohm, 1/16W           |
| R107             | 24872391 | Chip, 390 ohm, 1/16W            |
| R108             | 24872561 | Chip, 560 ohm, 1/16W            |
| R110             | 24872562 | Chip, 5600 ohm, 1/16W           |
| R111             | 24872472 | Chip, 47 ohm, 1/16W             |
| R112             | 24872182 | Chip, 1800 ohm, 1/16W           |
| R113             | 24872220 | Chip, 22 ohm, 1/16W             |
| R117             | 24871223 | Chip, 22k ohm, 1/8W             |
| R119             | 24872131 | Chip, 130 ohm, 1/16W            |
| R120             | 24872151 | Chip, 150 ohm, 1/16W            |
| R121             | 24872331 | Chip, 330 ohm, 1/16W            |
| R122             | 24872121 | Chip, 120 ohm, 1/16W            |
| R124             | 24871181 | Chip, 180 ohm, 1/8W             |
| R125             | 24552271 | OMF, 270 ohm, 1/2W              |
| R126             | 24553680 | OMF, 68 ohm, 1W                 |
| R128             | 24871104 | Chip, 100k ohm, 1/8W            |
| R151             | 24066599 | VR, 5k ohm, 1/10W               |
| R153             | 24066606 | VR, 1M ohm, 1/10W               |
| R170             | 24872102 | Chip, 1000 ohm, 1/16W           |
| R171             | 24872334 | Chip, 330k ohm, 1/16W           |
| R201             | 24366122 | CF, 1200 ohm                    |
| R202             | 24366471 | CF, 470 ohm                     |
| R203             | 24366472 | CF, 4700 ohm                    |
| R204             | 24366132 | CF, 1300 ohm                    |
| R205             | 24366182 | CF, 1800 ohm                    |
| R206             | 24871361 | Chip, 360 ohm, 1/8W             |
| R207             | 24872101 | Chip, 100 ohm, 1/16W            |
| R208             | 24552471 | OMF, 470 ohm, 1/2W              |
| R210             | 24871101 | Chip, 100 ohm, 1/8W             |
| R211             | 24366102 | CF, 1k ohm                      |

| Location No. | Part No. | Description            |
|--------------|----------|------------------------|
| R212         | 24366103 | CF, 10k ohm            |
| R213         | 24366152 | CF, 1500 ohm           |
| R214(U101)   | 24872102 | Chip, 1000 ohm, 1/16W  |
| R214(U902)   | 24366122 | CF, 1200 ohm           |
| R219         | 24366472 | CF, 4700 ohm           |
| R220         | 24366223 | CF, 22k ohm            |
| R221         | 24366223 | CF, 22k ohm            |
| R222         | 24366301 | CF, 300 ohm            |
| R242         | 24366203 | CF, 20k ohm            |
| R243         | 24366183 | CF, 18k ohm            |
| R252         | 24066597 | VR, 1k ohm, 1/10W      |
| R253         | 24066597 | VR, 1k ohm, 1/10W      |
| R261         | 24000576 | Chip, Jumper 3216 type |
| R301         | 24366301 | CF, 300 ohm            |
| R302         | 24366244 | CF, 240k ohm           |
| R305         | 24366161 | CF, 160 ohm            |
| R317         | 24366102 | CF, 1k ohm             |
| R326         | 24382470 | OMF, 47 ohm, 1W        |
| △ R327       | 24532130 | FR, 13 ohm, 1W         |
| R329         | 24366162 | CF, 1600 ohm           |
| R330         | 24366472 | CF, 4700 ohm           |
| R331         | 24366103 | CF, 10k ohm            |
| R332         | 24366683 | CF, 68k ohm            |
| R333         | 24366563 | CF, 56k ohm            |
| R334         | 24366103 | CF, 10k ohm            |
| R335         | 24366102 | CF, 1k ohm             |
| R336         | 24383271 | OMF, 270 ohm, 2W       |
| R337         | 24552202 | OMF, 2k ohm, 1/2W      |
| R338         | 24552122 | OMF, 1200 ohm, 1/2W    |
| R339         | 24322139 | OMF, 1.3 ohm, 1W       |
| R340         | 24366303 | CF, 30k ohm            |
| R341         | 24366183 | CF, 18k ohm            |
| R342         | 24366203 | CF, 20k ohm            |
| R343         | 24366473 | CF, 47k ohm            |
| R344         | 24366103 | CF, 10k ohm            |
| R345         | 24366125 | CF, 1.2M ohm           |
| R346         | 24366753 | CF, 75k ohm            |
| R347         | 24366684 | CF, 680k ohm           |
| R349         | 24366473 | CF, 47k ohm            |
| R351         | 24066602 | VR, 50k ohm, 1/10W     |
| R402         | 24366273 | CF, 27k ohm            |
| R403         | 24366302 | CF, 3k ohm             |
| R404         | 24552432 | OMF, 4300 ohm, 1/2W    |
| R405         | 24366431 | CF, 430 ohm            |
| R408         | 24366682 | CF, 6800 ohm           |
| R409         | 24366434 | CF, 430k ohm           |
| R410         | 24552472 | OMF, 4700 ohm, 1/2W    |
| R411         | 24366391 | CF, 390 ohm            |
| R412         | 24366121 | CF, 120 ohm            |
| R416         | 24007566 | Cement, 2k ohm, 5W     |
| R419         | 24942510 | CC, 51 ohm, 1/2W       |
| R420         | 24009951 | OMF, 1k ohm, 1W        |
| R421         | 24366105 | CF, 1M ohm             |
| R440         | 24552103 | OMF, 10k ohm, 1/2W     |
| R441         | 24552103 | OMF, 10k ohm, 1/2W     |
| △ R444       | 24007768 | Cement, 15 ohm, 10W    |
| R445         | 24383561 | OMF, 560 ohm, 2W       |
| △ R448       | 24322159 | OMF, 1.5 ohm, 1W       |
| R502         | 24366334 | CF, 330k ohm           |
| R504         | 24366391 | CF, 390 ohm            |
| R505         | 24366822 | CF, 8200 ohm           |
| R507         | 24366822 | CF, 8200 ohm           |
| R508         | 24366561 | CF, 560 ohm            |
| R509         | 24366122 | CF, 1200 ohm           |



| Location No. | Part No. | Description           |
|--------------|----------|-----------------------|
| R510         | 24366332 | CF, 3300 ohm          |
| R511         | 24366202 | CF, 2k ohm            |
| R512         | 24366182 | CF, 1800 ohm          |
| R513         | 24366122 | CF, 1200 ohm          |
| R514         | 24366223 | CF, 22k ohm           |
| R515         | 24366221 | CF, 220 ohm           |
| R516         | 24366221 | CF, 220 ohm           |
| R517         | 24366221 | CF, 220 ohm           |
| R518         | 24366223 | CF, 22k ohm           |
| R519         | 24366475 | CF, 4.7M ohm          |
| R520         | 24366332 | CF, 3300 ohm          |
| R521         | 24366102 | CF, 1k ohm            |
| R522         | 24366185 | CF, 1.8M ohm          |
| R525         | 24366133 | CF, 13k ohm           |
| R527         | 24366821 | CF, 820 ohm           |
| R528         | 24366561 | CF, 560 ohm           |
| R529         | 24366101 | CF, 100 ohm           |
| R530         | 24366101 | CF, 100 ohm           |
| R532         | 24366102 | CF, 1k ohm            |
| R533         | 24366162 | CF, 1600 ohm          |
| R535         | 24366301 | CF, 300 ohm           |
| R537         | 24366162 | CF, 1600 ohm          |
| R538         | 24366331 | CF, 330 ohm           |
| R539         | 24366162 | CF, 1600 ohm          |
| R541         | 24366821 | CF, 820 ohm           |
| R542         | 24366201 | CF, 200 ohm           |
| R543         | 24366103 | CF, 10k ohm           |
| R544         | 24366101 | CF, 100 ohm           |
| R545         | 24366102 | CF, 1k ohm            |
| R546         | 24366333 | CF, 33k ohm           |
| R547         | 24366102 | CF, 1k ohm            |
| R548         | 24366102 | CF, 1k ohm            |
| R549         | 24366102 | CF, 1k ohm            |
| R551         | 24066955 | VR, 1k ohm, 1/10W     |
| R557         | 24066600 | VR, 10k ohm, 1/10W    |
| R558         | 24066600 | VR, 10k ohm, 1/10W    |
| R559         | 24066600 | VR, 10k ohm, 1/10W    |
| R565         | 24366560 | CF, 56 ohm            |
| R566         | 24366560 | CF, 56 ohm            |
| R567         | 24366560 | CF, 56 ohm            |
| R568         | 24366102 | CF, 1k ohm            |
| R570         | 24366272 | CF, 2700 ohm          |
| R571         | 24366272 | CF, 2700 ohm          |
| R572         | 24366272 | CF, 2700 ohm          |
| R580         | 24366391 | CF, 390 ohm           |
| R581         | 24366331 | CF, 330 ohm           |
| R591         | 24009974 | OMF, 15k ohm, 2W      |
| R592         | 24009974 | OMF, 15k ohm, 2W      |
| R593         | 24009974 | OMF, 15k ohm, 2W      |
| R601         | 24872242 | Chip, 2400 ohm, 1/16W |
| R602         | 24872183 | Chip, 18k ohm, 1/16W  |
| R603         | 24872202 | Chip, 2k ohm, 1/16W   |
| R604         | 24872271 | Chip, 270 ohm, 1/16W  |
| R605         | 24553430 | OMF, 43 ohm, 1W       |
| R606         | 24872821 | Chip, 820 ohm, 1/16W  |
| R607         | 24872430 | Chip, 43 ohm, 1/16W   |
| R614         | 24872271 | Chip, 270 ohm, 1/16W  |
| R630         | 24366332 | CF, 3300 ohm          |
| R631         | 24366332 | CF, 3300 ohm          |
| R638         | 24366432 | CF, 4300 ohm          |
| R640         | 24366222 | CF, 2200 ohm          |
| R641         | 24366432 | CF, 4300 ohm          |
| R643         | 24366222 | CF, 2200 ohm          |
| R644         | 24321229 | OMF, 2.2 ohm, 1/2W    |

| Location No. | Part No. | Description              |
|--------------|----------|--------------------------|
| R645         | 24321229 | OMF, 2.2 ohm, 1/2W       |
| R646         | 24366223 | CF, 22k ohm              |
| R647         | 24366223 | CF, 22k ohm              |
| R649         | 24366913 | CF, 91k ohm              |
| R665         | 24552181 | OMF, 180 ohm, 1/2W       |
| R666         | 24552181 | OMF, 180 ohm, 1/2W       |
| R668         | 24366362 | CF, 3600 ohm             |
| R669         | 24366272 | CF, 2700 ohm             |
| R670         | 24366223 | CF, 22k ohm              |
| R675         | 24366101 | CF, 100 ohm              |
| R676         | 24366101 | CF, 100 ohm              |
| R801         | 24004914 | CC, 5.6M ohm, 1/2W       |
| △ R802       | 24007857 | Cement, 6.2 ohm, 15W     |
| R810         | 24377274 | CF, 270k ohm, 1W         |
| R811         | 24366103 | CF, 10k ohm              |
| R812         | 24366102 | CF, 1k ohm               |
| R813         | 24366102 | CF, 1k ohm               |
| R814         | 24366823 | CF, 82k ohm              |
| R815         | 24366221 | CF, 220 ohm              |
| R816         | 24367471 | CF, 470 ohm, ±2%         |
| R817         | 24321398 | OMF, 0.39 ohm, 1/2W      |
| R818         | 24384153 | OMF, 15k ohm, 3W         |
| R819         | 24366689 | CF, 6.8 ohm              |
| R820         | 24552102 | OMF, 1k ohm, 1/2W        |
| R821         | 24007743 | Cement, 180 ohm, 10W     |
| R822         | 24366390 | CF, 39 ohm               |
| R824         | 24366123 | CF, 12k ohm              |
| R825         | 24381220 | OMF, 22 ohm, 1/2W        |
| R826         | 24366102 | CF, 1k ohm               |
| R827         | 24366102 | CF, 1k ohm               |
| R830         | 24383203 | OMF, 2k ohm, 2W          |
| R831         | 24384822 | OMF, 8200 ohm, 3W        |
| R836         | 24321228 | OMF, 0.22 ohm, 1/2W      |
| R838         | 24383102 | OMF, 1k ohm, 2W          |
| R839         | 24366103 | CF, 10k ohm              |
| R840         | 24366105 | CF, 1M ohm               |
| R841         | 24366103 | CF, 10k ohm              |
| R842         | 24000900 | FR, 0.47 ohm, ±10%, 1W   |
| R843         | 24366103 | CF, 10k ohm              |
| R844         | 24366105 | CF, 1M ohm               |
| R845         | 24366392 | CF, 3900 ohm             |
| R846         | 24366562 | CF, 5600 ohm             |
| R847         | 24553473 | OMF, 47k ohm, 1W         |
| R849         | 24366272 | CF, 2700 ohm             |
| R861         | 24007642 | Cement, 5600 ohm, 5W     |
| R862         | 24383103 | OMF, 10k ohm, 2W         |
| R863         | 24366103 | CF, 10k ohm              |
| R871         | 24366103 | CF, 10k ohm              |
| R872         | 24366103 | CF, 10k ohm              |
| R873         | 24366103 | CF, 10k ohm              |
| R874         | 24366103 | CF, 10k ohm              |
| R875         | 24366562 | CF, 5600 ohm             |
| R877         | 24366102 | CF, 1k ohm               |
| R878         | 24366103 | CF, 10k ohm              |
| R880         | 24366682 | CF, 6800 ohm             |
| R882         | 24366513 | CF, 51k ohm              |
| R883         | 24366103 | CF, 10k ohm              |
| R884         | 24366103 | CF, 10k ohm              |
| R885         | 24366103 | CF, 10k ohm              |
| R886         | 24366103 | CF, 10k ohm              |
| △ R890       | 24000630 | PTC Thermistor, Dual     |
| R901         | 24946272 | CC, 2700 ohm, ±10%, 1/2W |
| R902         | 24946272 | CC, 2700 ohm, ±10%, 1/2W |
| R903         | 24946272 | CC, 2700 ohm, ±10%, 1/2W |



| Location No. | Part No. | Description                    |
|--------------|----------|--------------------------------|
| R920         | 24000888 | FR, 2 ohm, 1W                  |
| RA01         | 24366183 | CF, 18k ohm                    |
| RA02         | 24366562 | CF, 5600 ohm                   |
| RA03         | 24366103 | CF, 10k ohm                    |
| RA04         | 24366473 | CF, 47k ohm                    |
| RA05         | 24366473 | CF, 47k ohm                    |
| RA06         | 24366473 | CF, 47k ohm                    |
| RA07         | 24366222 | CF, 2200 ohm                   |
| RA08         | 24366101 | CF, 100 ohm                    |
| RA09         | 24366392 | CF, 3900 ohm                   |
| RA10         | 24366104 | CF, 100k ohm                   |
| RA11         | 24366103 | CF, 10k ohm                    |
| RA12         | 24366103 | CF, 10k ohm                    |
| RA13         | 24366102 | CF, 1k ohm                     |
| RA14         | 24366473 | CF, 47k ohm                    |
| RA15         | 24366103 | CF, 10k ohm                    |
| RA16         | 24366103 | CF, 10k ohm                    |
| RA17         | 24366103 | CF, 10k ohm                    |
| RA18         | 24366103 | CF, 10k ohm                    |
| RA19         | 24366102 | CF, 1k ohm                     |
| RA20         | 24366103 | CF, 10k ohm                    |
| RA21         | 24366561 | CF, 560 ohm                    |
| RA22         | 24366561 | CF, 560 ohm                    |
| RA23         | 24366103 | CF, 10k ohm                    |
| RA24         | 24366225 | CF, 2.2M ohm                   |
| RA25         | 24366153 | CF, 15k ohm                    |
| RA26         | 24946226 | CC, 22M ohm, $\pm 10\%$ , 1/2W |
| RA27         | 24366333 | CF, 33k ohm                    |
| RA28         | 24366333 | CF, 33k ohm                    |
| RA29         | 24366103 | CF, 10k ohm                    |
| RA30         | 24366473 | CF, 47k ohm                    |
| RA31         | 24366473 | CF, 47k ohm                    |
| RA32         | 24366473 | CF, 47k ohm                    |
| RA33         | 24366473 | CF, 47k ohm                    |
| RA34         | 24366333 | CF, 33k ohm                    |
| RA35         | 24366223 | CF, 22k ohm                    |
| RA36         | 24366102 | CF, 1k ohm                     |
| RA37         | 24366473 | CF, 47k ohm                    |
| RA38         | 24366331 | CF, 330 ohm                    |
| RA40         | 24366472 | CF, 4700 ohm                   |
| RA42         | 24366472 | CF, 4700 ohm                   |
| RA43         | 24366103 | CF, 10k ohm                    |
| RA44         | 24366103 | CF, 10k ohm                    |
| RA45         | 24366183 | CF, 18k ohm                    |
| RA46         | 24366123 | CF, 12k ohm                    |
| RA47         | 24366152 | CF, 1500 ohm                   |
| RA48         | 24366473 | CF, 47k ohm                    |
| RA56         | 24366123 | CF, 12k ohm                    |
| RA57         | 24366392 | CF, 3900 ohm                   |
| RA58         | 24366152 | CF, 1500 ohm                   |
| RA59         | 24366392 | CF, 3900 ohm                   |
| RA60         | 24366392 | CF, 3900 ohm                   |
| RA61         | 24366102 | CF, 1k ohm                     |
| RA62         | 24366103 | CF, 10k ohm                    |
| RA63         | 24366103 | CF, 10k ohm                    |
| RA66         | 24366102 | CF, 1k ohm                     |
| RA67         | 24366153 | CF, 15k ohm                    |
| RA70         | 24366561 | CF, 560 ohm                    |
| RA71         | 24366564 | CF, 560k ohm                   |
| RA72         | 24366563 | CF, 56k ohm                    |
| RA73         | 24366123 | CF, 12k ohm                    |
| RA74         | 24366392 | CF, 3900 ohm                   |
| RA75         | 24366103 | CF, 10k ohm                    |
| RA76         | 24366473 | CF, 47k ohm                    |

| Location No. | Part No. | Description           |
|--------------|----------|-----------------------|
| RA79         | 24366153 | CF, 15k ohm           |
| RA81         | 24366101 | CF, 100 ohm           |
| RA82         | 24366101 | CF, 100 ohm           |
| RA83         | 24366103 | CF, 10k ohm           |
| RA84         | 24366103 | CF, 10k ohm           |
| RA85         | 24366103 | CF, 10k ohm           |
| RA86         | 24366103 | CF, 10k ohm           |
| RA87         | 24366103 | CF, 10k ohm           |
| RA89         | 24366471 | CF, 470 ohm           |
| RA90         | 24366391 | CF, 390 ohm           |
| RA91         | 24366223 | CF, 22k ohm           |
| RA92         | 24366473 | CF, 47k ohm           |
| RA93         | 24366391 | CF, 390 ohm           |
| RA95         | 24366473 | CF, 47k ohm           |
| RA96         | 24366102 | CF, 1k ohm            |
| RA97         | 24366101 | CF, 100 ohm           |
| RA98         | 24366101 | CF, 100 ohm           |
| RB01         | 24366103 | CF, 10k ohm           |
| RB02         | 24366332 | CF, 3300 ohm          |
| RB03         | 24366103 | CF, 10k ohm           |
| RB04         | 24366103 | CF, 10k ohm           |
| RB05         | 24366222 | CF, 2200 ohm          |
| RB06         | 24366473 | CF, 47k ohm           |
| RF03         | 24366100 | CF, 10 ohm            |
| RF04         | 24366273 | CF, 27k ohm           |
| RF05         | 24366472 | CF, 4700 ohm          |
| RF06         | 24366103 | CF, 10k ohm           |
| RF07         | 24366103 | CF, 10k ohm           |
| RF08         | 24366101 | CF, 100 ohm           |
| RF09         | 24366101 | CF, 100 ohm           |
| RF11         | 24366272 | CF, 2700 ohm          |
| RF12         | 24366103 | CF, 10k ohm           |
| RF13         | 24366101 | CF, 100 ohm           |
| RF14         | 24366101 | CF, 100 ohm           |
| RF15         | 24366392 | CF, 3900 ohm          |
| RF16         | 24366682 | CF, 6800 ohm          |
| RF17         | 24366332 | CF, 3300 ohm          |
| RF18         | 24366682 | CF, 6800 ohm          |
| RF19         | 24366101 | CF, 100 ohm           |
| RF80         | 24546279 | FR, 2.7 ohm, 1/2W     |
| RF81         | 24383123 | OMF, 12k ohm, 2W      |
| RG02         | 24872361 | Chip, 360 ohm, 1/16W  |
| RG03         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG04         | 24872563 | Chip, 56k ohm, 1/16W  |
| RG05         | 24872563 | Chip, 56k ohm, 1/16W  |
| RG06         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG07         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG08         | 24872332 | Chip, 3300 ohm, 1/16W |
| RG10         | 24872303 | Chip, 30k ohm, 1/16W  |
| RG11         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG12         | 24872472 | Chip, 47 ohm, 1/16W   |
| RG13         | 24872472 | Chip, 47 ohm, 1/16W   |
| RG14         | 24872223 | Chip, 22k ohm, 1/16W  |
| RG18         | 24872223 | Chip, 22k ohm, 1/16W  |
| RG19         | 24872103 | Chip, 10k ohm, 1/16W  |
| RG21         | 24871223 | Chip, 22k ohm, 1/8W   |
| RG23         | 24872223 | Chip, 22k ohm, 1/16W  |
| RG25         | 24872203 | Chip, 20k ohm, 1/16W  |
| RG26         | 24872202 | Chip, 2k ohm, 1/16W   |
| RG27         | 24872103 | Chip, 10k ohm, 1/16W  |
| RG28         | 24871223 | Chip, 22k ohm, 1/8W   |
| RG29         | 24872103 | Chip, 10k ohm, 1/16W  |
| RG31         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG32         | 24872101 | Chip, 100 ohm, 1/16W  |



| Location No. | Part No. | Description           |
|--------------|----------|-----------------------|
| RG34         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG35         | 24872562 | Chip, 5600 ohm, 1/16W |
| RG36         | 24872472 | Chip, 47 ohm, 1/16W   |
| RG37         | 24872563 | Chip, 56k ohm, 1/16W  |
| RG38         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG40         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG42         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG44         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG45         | 24872103 | Chip, 10k ohm, 1/16W  |
| RG46         | 24872101 | Chip, 100 ohm, 1/16W  |
| RG47         | 24872272 | Chip, 2700 ohm, 1/16W |
| RG50         | 24066926 | VR, 10k ohm, 1/10W    |
| RG60         | 24553101 | OMF, 100 ohm, 1W      |
| RG61         | 24872152 | Chip, 1500 ohm, 1/16W |
| RG62         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG63         | 24872222 | Chip, 2200 ohm, 1/16W |
| RG64         | 24872273 | Chip, 27k ohm, 1/16W  |
| RG65         | 24872133 | Chip, 13k ohm, 1/16W  |
| RG66         | 24872152 | Chip, 1500 ohm, 1/16W |
| RG67         | 24872273 | Chip, 27k ohm, 1/16W  |
| RG68         | 24872133 | Chip, 13k ohm, 1/16W  |
| RG70         | 24872222 | Chip, 2200 ohm, 1/16W |
| RG81         | 24872152 | Chip, 1500 ohm, 1/16W |
| RG82         | 24872162 | Chip, 1600 ohm, 1/16W |
| RG83         | 24872153 | Chip, 15k ohm, 1/16W  |
| RG84         | 24872102 | Chip, 1000 ohm, 1/16W |
| RG85         | 24872471 | Chip, 470 ohm, 1/16W  |
| RG90         | 24545100 | FR, 10 ohm, 1/4W      |
| RM03         | 24366272 | CF, 2700 ohm          |
| RM04         | 24366432 | CF, 4300 ohm          |
| RM05         | 24366221 | CF, 220 ohm           |
| RM06         | 24366271 | CF, 270 ohm           |
| RM07         | 24366475 | CF, 4.7M ohm          |
| RM08         | 24366333 | CF, 33k ohm           |
| RN06         | 24366473 | CF, 47k ohm           |
| RN07         | 24366223 | CF, 22k ohm           |
| RN08         | 24366185 | CF, 1.8M ohm          |
| RN09         | 24366103 | CF, 10k ohm           |
| RN18         | 24366473 | CF, 47k ohm           |
| RN19         | 24366103 | CF, 10k ohm           |
| RN23         | 24366473 | CF, 47k ohm           |
| RN26         | 24366133 | CF, 13k ohm           |
| RN28         | 24366202 | CF, 2k ohm            |
| RN29         | 24366272 | CF, 2700 ohm          |
| RN32         | 24366243 | CF, 24k ohm           |
| RV02         | 24366101 | CF, 100 ohm           |
| RV03         | 24366101 | CF, 100 ohm           |
| RV04         | 24366101 | CF, 100 ohm           |
| RV05         | 24366101 | CF, 100 ohm           |
| RV06         | 24366101 | CF, 100 ohm           |
| RV07         | 24366101 | CF, 100 ohm           |
| RV08         | 24366101 | CF, 100 ohm           |
| RV09         | 24366101 | CF, 100 ohm           |
| RV10         | 24366101 | CF, 100 ohm           |
| RV11         | 24366101 | CF, 100 ohm           |
| RV12         | 24366101 | CF, 100 ohm           |
| RV13         | 24366101 | CF, 100 ohm           |
| RV14         | 24366101 | CF, 100 ohm           |
| RV15         | 24366101 | CF, 100 ohm           |
| RV16         | 24366104 | CF, 100k ohm          |
| RV17         | 24366104 | CF, 100k ohm          |
| RV18         | 24366104 | CF, 100k ohm          |
| RV19         | 24366104 | CF, 100k ohm          |
| RV20         | 24366104 | CF, 100k ohm          |

| Location No. | Part No. | Description           |
|--------------|----------|-----------------------|
| RV21         | 24366104 | CF, 100k ohm          |
| RV22         | 24366104 | CF, 100k ohm          |
| RV23         | 24366104 | CF, 100k ohm          |
| RV24         | 24366471 | CF, 470 ohm           |
| RV25         | 24366331 | CF, 330 ohm           |
| RV26         | 24366680 | CF, 68 ohm            |
| RV27         | 24366102 | CF, 1k ohm            |
| RV28         | 24366102 | CF, 1k ohm            |
| RV29         | 24366820 | CF, 82 ohm            |
| RV31         | 24366910 | CF, 91 ohm            |
| RV32         | 24366910 | CF, 91 ohm            |
| RV34         | 24872102 | Chip, 1000 ohm, 1/16W |
| RV34         | 24366102 | CF, 1k ohm            |
| RV35         | 24872471 | Chip, 470 ohm, 1/16W  |
| RV36         | 24872103 | Chip, 10k ohm, 1/16W  |
| RV37         | 24872332 | Chip, 3300 ohm, 1/16W |
| RV39         | 24366910 | CF, 91 ohm            |
| RV40         | 24366680 | CF, 68 ohm            |
| RV41         | 24366103 | CF, 10k ohm           |
| RV42         | 24366750 | CF, 75 ohm            |
| RV43         | 24366750 | CF, 75 ohm            |
| RV44         | 24366750 | CF, 75 ohm            |
| RV45         | 24366750 | CF, 75 ohm            |
| RV51         | 24552101 | OMF, 100 ohm, 1/2W    |
| RV52         | 24872102 | Chip, 1000 ohm, 1/16W |
| RV53         | 24871101 | Chip, 100 ohm, 1/8W   |
| RV56         | 24552161 | OMF, 160 ohm, 1/2W    |
| RV60         | 24552101 | OMF, 100 ohm, 1/2W    |
| RV69         | 24366102 | CF, 1k ohm            |
| RV70         | 24366471 | CF, 470 ohm           |
| RV73         | 24366910 | CF, 91 ohm            |
| RV74         | 24366103 | CF, 10k ohm           |
| RV75         | 24366821 | CF, 820 ohm           |
| RV76         | 24366201 | CF, 200 ohm           |
| RV77         | 24366101 | CF, 100 ohm           |
| RV78         | 24366101 | CF, 100 ohm           |
| RV79         | 24552391 | OMF, 390 ohm, 1/2W    |
| RV80         | 24366102 | CF, 1k ohm            |
| RV81         | 24366101 | CF, 100 ohm           |
| RV82         | 24366621 | CF, 620 ohm           |
| RV83         | 24366621 | CF, 620 ohm           |
| RV84         | 24366621 | CF, 620 ohm           |
| RV85         | 24366621 | CF, 620 ohm           |
| RV86         | 24366471 | CF, 470 ohm           |
| RV87         | 24366331 | CF, 330 ohm           |
| RW04         | 24366101 | CF, 100 ohm           |
| RW07         | 24366101 | CF, 100 ohm           |
| RW15         | 24366104 | CF, 100k ohm          |
| RW16         | 24366104 | CF, 100k ohm          |
| RW21         | 24366471 | CF, 470 ohm           |
| RW22         | 24366471 | CF, 470 ohm           |
| RW24         | 24366471 | CF, 470 ohm           |
| RW25         | 24366471 | CF, 470 ohm           |
| RW26         | 24366104 | CF, 100k ohm          |
| RW28         | 24366472 | CF, 4700 ohm          |
| RW29         | 24366104 | CF, 100k ohm          |
| RW40         | 24366910 | CF, 91 ohm            |
| RW80         | 24366101 | CF, 100 ohm           |
| RW81         | 24366101 | CF, 100 ohm           |
| RW83         | 24552161 | OMF, 160 ohm, 1/2W    |
| RY01         | 24366473 | CF, 47k ohm           |
| RY02         | 24366183 | CF, 18k ohm           |
| RY03         | 24366391 | CF, 390 ohm           |
| RY04         | 24366473 | CF, 47k ohm           |



| Location No. | Part No. | Description  |
|--------------|----------|--------------|
| RY51         | 24366101 | CF, 100 ohm  |
| RY52         | 24366101 | CF, 100 ohm  |
| RY53         | 24366101 | CF, 100 ohm  |
| RY54         | 24366101 | CF, 100 ohm  |
| RY55         | 24366181 | CF, 180 ohm  |
| RY56         | 24366181 | CF, 180 ohm  |
| RY57         | 24366181 | CF, 180 ohm  |
| RY61         | 24366152 | CF, 1500 ohm |
| RY62         | 24366511 | CF, 510 ohm  |
| RY63         | 24366101 | CF, 100 ohm  |
| RY64         | 24366101 | CF, 100 ohm  |
| RY65         | 24366101 | CF, 100 ohm  |
| RY66         | 24366122 | CF, 1200 ohm |
| RY67         | 24366122 | CF, 1200 ohm |
| RY68         | 24366122 | CF, 1200 ohm |

### COILS & TRANSFORMERS

|        |          |                                   |
|--------|----------|-----------------------------------|
| L101   | 23262819 | Coil, PIF, TRF1071D               |
| L102   | 23238704 | Coil, Peaking, TRF4680AJ          |
| L103   | 23238704 | Coil, Peaking, TRF4680AJ          |
| L104   | 23262650 | Coil, IF, TRF1149D                |
| L107   | 23262951 | Coil, RF Choke, TRF1019           |
| L108   | 23238558 | Coil, Peaking, TRF4R47AJ          |
| L151   | 23262783 | Coil, IF, TRF1105                 |
| L152   | 23262813 | Coil, IF, TRF1077D                |
| L201   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L202   | 23238718 | Coil, Peaking, TRF4479AJ          |
| L203   | 23238914 | Coil, Peaking, TRF4470AC          |
| L204   | 23238720 | Coil, Peaking, TRF4339AJ          |
| L208   | 23238704 | Coil, Peaking, TRF4680AJ          |
| L220   | 23238706 | Coil, Peaking, TRF4470AJ          |
| L315   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L330   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L331   | 23103901 | Coil (Ferrite Bead), TEM2017      |
| L405   | 23221685 | Coil, Choke, TLN3193              |
| L406   | 23103859 | Coil (Ferrite Bead), TEM2011      |
| L411   | 23222657 | Coil, Linearity, TLN2072          |
| △ L462 | .....    | DY, Supplied with V901            |
| L503   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L525   | 23238708 | Coil, Peaking, TRF4330AJ          |
| L551   | 23250972 | Coil, 1H-Delay Matching, TRF5418D |
| L590   | 23289221 | Coil, Peaking, TRF4221AF          |
| L591   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L601   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L801   | 23221077 | Coil, Choke, TLN1015S             |
| L802   | 23103859 | Coil (Ferrite Bead), TEM2011      |
| L803   | 23221747 | Coil, Choke, TRF9253D             |
| L804   | 23221747 | Coil, Choke, TRF9253D             |
| L806   | 23103859 | Coil (Ferrite Bead), TEM2011      |
| L829   | 23238714 | Coil, Peaking, TRF4100AJ          |
| L830   | 23222694 | Coil, Width, TLN2026              |
| L833   | 23222694 | Coil, Width, TLN2026              |
| L834   | 23103859 | Coil (Ferrite Bead), TEM2011      |
| △ L901 | 23200205 | Coil, Degaussing, TSB-2333AR      |
| LA01   | 23238562 | Coil, Peaking, TRF4109AJ          |
| LA12   | 23221803 | Coil, Choke, TLN3040D             |
| LB01   | 23262001 | Coil, IF, TRF1166D                |
| LF01   | 23238712 | Coil, Peaking, TRF4150AJ          |
| LF02   | 23238712 | Coil, Peaking, TRF4150AJ          |
| LF03   | 23238720 | Coil, Peaking, TRF4339AJ          |
| LF04   | 23238562 | Coil, Peaking, TRF4109AJ          |
| LF05   | 23238714 | Coil, Peaking, TRF4100AJ          |

| Location No. | Part No. | Description                        |
|--------------|----------|------------------------------------|
| LF06         | 23238714 | Coil, Peaking, TRF4100AJ           |
| LF07         | 23238714 | Coil, Peaking, TRF4100AJ           |
| LF08         | 23238714 | Coil, Peaking, TRF4100AJ           |
| LF09         | 23238506 | Coil, Peaking, TRF4229AJ           |
| LF10         | 23238506 | Coil, Peaking, TRF4229AJ           |
| LF11         | 23103859 | Coil (Ferrite Bead), TEM2011       |
| LF12         | 23238506 | Coil, Peaking, TRF4229AJ           |
| LF13         | 23238714 | Coil, Peaking, TRF4100AJ           |
| LF15         | 23103859 | Coil (Ferrite Bead), TEM2011       |
| LF84         | 23222694 | Coil, Width, TLN2026               |
| LG01         | 23262808 | Coil, IF, TRF1082                  |
| LG04         | 23238713 | Coil, Peaking, TRF4120AJ           |
| LG05         | 23232946 | Coil, Variable, TRF3073D           |
| LG80         | 23232946 | Coil, Variable, TRF3073D           |
| LM01         | 23262797 | Coil, IF, TRF1093D                 |
| LM02         | 23262002 | Coil, IF, TRF1167D                 |
| LM03         | 23262002 | Coil, IF, TRF1167D                 |
| LM04         | 23262798 | Coil, IF, TRF1092D                 |
| LV01         | 23238710 | Coil, Peaking, TRF4220AJ           |
| LV02         | 23238715 | Coil, Peaking, TRF4829AJ           |
| △ T401       | 23224983 | Transformer, Horiz. Drive, TLN1039 |
| △ T461       | 23236245 | Transformer, Flyback, AT2078/21    |
| T801         | 23211891 | Line Filter, TRF3164               |
| △ T803       | 23217110 | Transformer, Converter, 47317550   |
| TN01         | 23232002 | Coil, Variable, TRE3520D           |
| TN02         | 23262843 | Coil, PIF Trap, TRF1457D           |

### SEMICONDUCTORS

|        |          |                          |
|--------|----------|--------------------------|
| IC101  | 23318439 | IC, M52008P              |
| IC330  | 23319459 | IC, LA7837               |
| IC408  | 23319203 | IC, MC7812CT             |
| IC501  | B0383970 | IC, TA8783N              |
| IC605  | 23318413 | IC, LA4282               |
| IC801  | 23318232 | IC, TDA4601              |
| IC805  | 23318299 | IC, L78MR05-FA           |
| ICA01  | 23319159 | IC, CXP80424-119S        |
| ICA05  | 23119441 | IC, LA7910               |
| ICA07  | 23319016 | IC, $\mu$ PD6254CX       |
| ICF02  | 23319143 | IC, SAA5246P/E           |
| ICF03  | 23319001 | IC, IMS1630LP12          |
| ICG01  | 23318023 | IC, TDA6611              |
| ICG03  | B0325290 | IC, TA7337P              |
| ICG30  | B0325290 | IC, TA7337P              |
| ICV01  | B0383940 | IC, TA8777N              |
| ICV22  | B0370110 | IC, TA78L09S             |
| ICV23  | B0370110 | IC, TA78L09S             |
| ICY50  | B0383930 | IC, TA8775N              |
| Q102   | A6357139 | Transistor, 2SC3125 FA-6 |
| Q103   | A6357139 | Transistor, 2SC3125 FA-6 |
| Q202   | 23114691 | Transistor, BC557A       |
| Q203   | A6335477 | Transistor, 2SC2712-Y    |
| Q204   | A6534040 | Transistor, 2SA1015-Y    |
| Q220   | 23114689 | Transistor, BC547A       |
| Q330B  | 23035308 | Screw, BTB3X8SZN         |
| Q332   | 23114689 | Transistor, BC547A       |
| Q333   | 23114689 | Transistor, BC547A       |
| Q334   | 23114689 | Transistor, BC547A       |
| Q402   | A6330069 | Transistor, 2SC2482 FA-1 |
| △ Q404 | 23314375 | Transistor, ON4409       |
| Q505   | A6363200 | Transistor, 2SC3619      |
| Q506   | 23114689 | Transistor, BC547A       |



| Location No. | Part No. | Description                   |
|--------------|----------|-------------------------------|
| Q507         | A6363200 | Transistor, 2SC3619           |
| Q508         | 23114689 | Transistor, BC547A            |
| Q509         | A6363200 | Transistor, 2SC3619           |
| Q510         | 23114689 | Transistor, BC547A            |
| Q512         | 23114689 | Transistor, BC547A            |
| Q514         | 23114688 | Transistor, BC327             |
| Q516         | 23114689 | Transistor, BC547A            |
| Q546         | 23114689 | Transistor, BC547A            |
| Q601         | A6335477 | Transistor, 2SC2712-Y         |
| Q602         | A6335477 | Transistor, 2SC2712-Y         |
| Q604         | 23114691 | Transistor, BC557A            |
| Q609         | A6342200 | Transistor, 2SC2878-A         |
| Q610         | A6342200 | Transistor, 2SC2878-A         |
| Q802         | A6868767 | Transistor, 2SD1428           |
| Q810         | 23114632 | Transistor, BC547B            |
| Q811         | 23114632 | Transistor, BC547B            |
| Q812         | A6342200 | Transistor, 2SC2878-A         |
| Q813         | 23114632 | Transistor, BC547B            |
| Q815         | 23114632 | Transistor, BC547B            |
| Q816         | 23114632 | Transistor, BC547B            |
| Q817         | 23114632 | Transistor, BC547B            |
| Q833         | A6907751 | Transistor, S1854             |
| Q840         | 23114546 | Transistor, BC557B            |
| Q841         | A6547250 | Transistor, 2SA1320           |
| Q842         | A6325067 | Transistor, 2SC2230A-Y        |
| Q843         | A6547303 | Transistor, 2SA1321           |
| Q844         | 23114546 | Transistor, BC557B            |
| Q845         | 23314246 | Transistor, 2SC2023 LF-4      |
| QA02         | A6342200 | Transistor, 2SC2878-A         |
| QA03         | 23114689 | Transistor, BC547A            |
| QA04         | 23114689 | Transistor, BC547A            |
| QA06         | 23114689 | Transistor, BC547A            |
| QA10         | 23114689 | Transistor, BC547A            |
| QA11         | 23114691 | Transistor, BC557A            |
| QA12         | A6342200 | Transistor, 2SC2878-A         |
| QA13         | 23114689 | Transistor, BC547A            |
| QA14         | 23114689 | Transistor, BC547A            |
| QA25         | 23114689 | Transistor, BC547A            |
| QA90         | 23114689 | Transistor, BC547A            |
| QB01         | 23114689 | Transistor, BC547A            |
| QB02         | 23114689 | Transistor, BC547A            |
| QF04         | 23114689 | Transistor, BC547A            |
| QF05         | 23114689 | Transistor, BC547A            |
| QF80         | A6842185 | Transistor, 2SD553-Y          |
| QG02         | A6335477 | Transistor, 2SC2712-Y         |
| QG04         | A6335477 | Transistor, 2SC2712-Y         |
| QG06         | A6335477 | Transistor, 2SC2712-Y         |
| QG07         | A6335477 | Transistor, 2SC2712-Y         |
| QG08         | A6335477 | Transistor, 2SC2712-Y         |
| QG09         | A6335477 | Transistor, 2SC2712-Y         |
| QG10         | A6335477 | Transistor, 2SC2712-Y         |
| QG11         | A6335477 | Transistor, 2SC2712-Y         |
| QG12         | A6335477 | Transistor, 2SC2712-Y         |
| QN05         | 23114689 | Transistor, BC547A            |
| QN11         | A6342200 | Transistor, 2SC2878-A         |
| QV02         | 23114691 | Transistor, BC557A            |
| QV04         | 23118980 | Transistor, BC337             |
| QV30         | A6541130 | Transistor, 2SA1162-Y         |
| QV50         | A6357139 | Transistor, 2SC3125 FA-6      |
| QV80         | 23114689 | Transistor, BC547A            |
| QY01         | A6734585 | Transistor, 2SC752GTM-O       |
| D101         | A7288601 | Diode, 1S2186 FA-1            |
| D102         | A7288601 | Diode, 1S2186 FA-1            |
| D108         | 23115878 | Diode, Zener, $\mu$ PC574J(L) |

| Location No.         | Part No. | Description                 |
|----------------------|----------|-----------------------------|
| D109                 | 23115599 | Diode, 1N4148               |
| D241                 | A7150041 | Diode, 1SS104               |
| D302                 | 23118479 | Diode, BYD33J               |
| D340                 | 23115599 | Diode, 1N4148               |
| D341                 | 23118479 | Diode, BYD33J               |
| D342                 | 23115599 | Diode, 1N4148               |
| D343                 | 23115599 | Diode, 1N4148               |
| D345                 | 23316337 | Diode, Zener, uZ13BSC       |
| D401                 | A7116925 | Diode, Zener, 04AZ9.1Z      |
| D402                 | A7118215 | Diode, Zener, 04AZ33-Y      |
| D403                 | A7117215 | Diode, Zener, 04AZ12Y       |
| D406                 | 23118479 | Diode, BYD33J               |
| D408                 | 23118052 | Diode, RU4Z                 |
| D410                 | A7116815 | Diode, Zener, 04AZ8.2Y      |
| D594                 | 23115599 | Diode, 1N4148               |
| D595                 | 23115599 | Diode, 1N4148               |
| D596                 | 23115599 | Diode, 1N4148               |
| D601                 | 23115599 | Diode, 1N4148               |
| D602                 | 23115599 | Diode, 1N4148               |
| D801                 | 23316391 | Diode, D3SB60 (4103)        |
| D805                 | 23118479 | Diode, BYD33J               |
| D807                 | 23118479 | Diode, BYD33J               |
| D808                 | 23118736 | Diode, BYV96E               |
| D809                 | 23118451 | Diode, RU4A                 |
| D810                 | 23118052 | Diode, RU4Z                 |
| D811                 | 23118479 | Diode, BYD33J               |
| D812                 | A7117305 | Diode, Zener, 04AZ13X       |
| D813                 | 23118479 | Diode, BYD33J               |
| D814                 | A8643106 | Photo Coupler, TLP621(GR)   |
| D815                 | 23115599 | Diode, 1N4148               |
| D830                 | A8643106 | Photo Coupler, TLP621(GR)   |
| D832                 | 23316307 | Diode, Zener, uZ5.1BSC      |
| D834                 | A7275400 | Diode, 1S2462               |
| D836                 | 23118052 | Diode, RU4Z                 |
| D841                 | A7275400 | Diode, 1S2462               |
| D842                 | A7275400 | Diode, 1S2462               |
| D845                 | 23115599 | Diode, 1N4148               |
| DA01                 | A7116425 | Diode, Zener, 04AZ5.6Z      |
| DA04                 | 23115599 | Diode, 1N4148               |
| DA05                 | 23115599 | Diode, 1N4148               |
| DA06                 | 23115599 | Diode, 1N4148               |
| DA15                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DA16                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DA17                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DA32                 | 23115599 | Diode, 1N4148               |
| DA96                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DA98                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DA99                 | A7116515 | Diode, Zener, 04AZ6.2Y      |
| DE50                 | A8636541 | Diode (LED), TLS1 53, Red   |
| DF80                 | A7116415 | Diode, Zener, 04AZ5.6Y      |
| DG05                 | A7288601 | Diode, 1S2186 FA-1          |
| DG06                 | A7288601 | Diode, 1S2186 FA-1          |
| DG07                 | A7288601 | Diode, 1S2186 FA-1          |
| DG14                 | A7150258 | Diode, 1SS176               |
| DN25                 | A7288601 | Diode, 1S2186 FA-1          |
| DT50                 | A8606431 | Diode (LED), TLG1 53, Green |
| DV07                 | 23115599 | Diode, 1N4148               |
| <b>MISCELLANEOUS</b> |          |                             |
| B202                 | 23443043 | Knob, SUB                   |
| △ F801               | 23144898 | Fuse, 3.15A                 |
| F801A                | 23165102 | Fuse Holder                 |
| △ F803               | 23144827 | Fuse, 0.63A                 |
| F803A                | 23165102 | Fuse Holder                 |



| Location No. | Part No. | Description                             |
|--------------|----------|---|
| K901         | 23120303 | Remote Sensor, IR-9109-K                |
| P666         | 23363607 | Headphone Jack, 3.5mm                   |
| △ P801       | 23176705 | Power Cord                              |
| PH01         | 23365598 | 21 Pin Connector                        |
| PH02         | 23365598 | 21 Pin Connector                        |
| PH03         | 23365506 | Jack, S+2P                              |
| PH04         | 23365351 | Jack, 3P                                |
| PH05         | 23161699 | Terminal, 4P                            |
| S301         | 23145682 | Switch, Lever, 1C3P                     |
| S501         | 23145430 | Switch, Push, 1C1P                      |
| S502         | 23145430 | Switch, Push, 1C1P                      |
| S503         | 23145430 | Switch, Push, 1C1P                      |
| S504         | 23145430 | Switch, Push, 1C1P                      |
| △ S801       | 23145434 | Switch, Power, 2C2P                     |
| SV02         | 23145467 | Switch, Slide, 2C2P                     |
| △ V901A      | 23902019 | Socket, CRT, 10P                        |
| W201         | 23250953 | Delay Line, TRF2107A                    |
| W661         | 23351001 | Speaker, SPK-1337,<br>120x60mm, 4 ohm   |
| W662         | 23351001 | Speaker, SPK-1337,<br>120x60mm, 4 ohm   |
| X401         | 23153721 | Ceramic Resonator, 503kHz,<br>TCR1023   |
| X501         | 23153979 | Crystal, 4.43MHz                        |
| X502         | 23250950 | Coil, 1H-Delay Line, DL711              |
| XA01         | 23153845 | Ceramic Resonator, 4MHz,<br>TCR1015     |
| XN01         | 23153961 | Crystal, 3.58MHz                        |
| Z101         | A5615249 | PIF SAW Filter, F1804D                  |
| Z201         | 23107927 | Ceramic Video Trap, 5.5MHz,<br>TCF1011  |
| Z202         | 23107913 | Ceramic Video Trap, 6.5MHz,<br>TCF1018  |
| Z661         | 23107742 | Filter, TEM1014                         |
| Z662         | 23107742 | Filter, TEM1014                         |
| Z663         | 23107742 | Filter, TEM1014                         |
| Z664         | 23107742 | Filter, TEM1014                         |
| ZF01         | 23153012 | Crystal, 27MHz                          |
| ZG03         | 23107949 | Ceramic Filter, 6.5MHz,<br>SFE6.5MBF    |
| ZG04         | 23107855 | Ceramic Filter, 5.5MHz,<br>TCF1031      |
| ZG80         | 23107856 | Ceramic Filter, 5.74MHz,<br>TCF1030     |
| ZV01         | 23107849 | Ceramic Video Trap,<br>4.43MHz, TCF1032 |
| ZV02         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV03         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV04         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV05         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV06         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV07         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV08         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV09         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV10         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV11         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV14         | 23107787 | Ceramic Video Trap,<br>3.58MHz, TCF1044 |
| ZV15         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV16         | 23107744 | Filter, 3MHz, TEM1012                   |
| ZV23         | 23107742 | Filter, TEM1014                         |
| ZV24         | 23107742 | Filter, TEM1014                         |
| ZV25         | 23107742 | Filter, TEM1014                         |
| ZV26         | 23107742 | Filter, TEM1014                         |

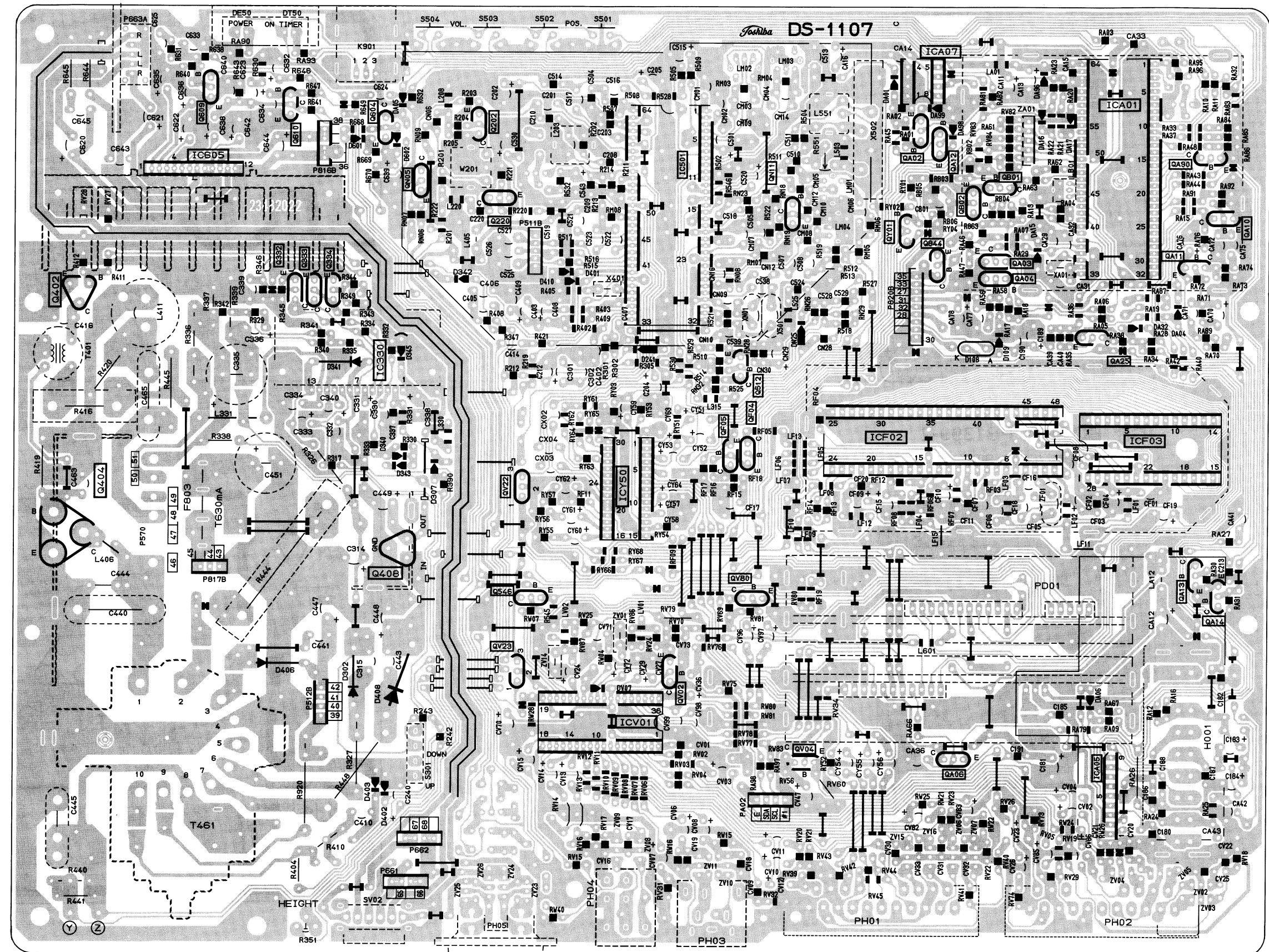
| Location No.                 | Part No. | Description                      |
|------------------------------|----------|----------------------------------|
| <b>PC BOARD ASSEMBLIES</b>   |          |                                  |
| U101                         | 23337786 | PIF Board, PB1399-1              |
| U902A                        | 23337788 | Main Board, PB1400               |
| U903A                        | 23337789 | Power-1 Board, PB1401-1          |
| U903B                        | 23337790 | CRT Drive Board, PB1401-2        |
| U903C                        | 23337791 | Power-2 Board, PB1401-3          |
| U903D                        | 23337792 | Headphone Board, PB1401-4        |
| UG01                         | 23337787 | IGR Board, PB1399-2              |
| <b>PICTURE TUBE</b>          |          |                                  |
| △ V901                       | 23112348 | Picture Tube, A51EAL30X01        |
| <b>TUNER</b>                 |          |                                  |
| H001                         | 23321005 | Tuner VHF/UHF, EG449X1           |
| <b>REMOTE HAND SET PARTS</b> |          |                                  |
| K902                         | 23120032 | Remote Hand Unit, CT-9573        |
| AT01                         | 23305026 | Upper Case                       |
| AT02                         | 23305359 | Lower Case                       |
| AT03                         | 23305360 | Battery Cover                    |
| ST01                         | 23305028 | Rubber Sheet                     |
| UT01                         | 23337760 | PC Board, PB1385                 |
| ZT01                         | 23153736 | Ceramic Resonator,<br>CSB455EB20 |



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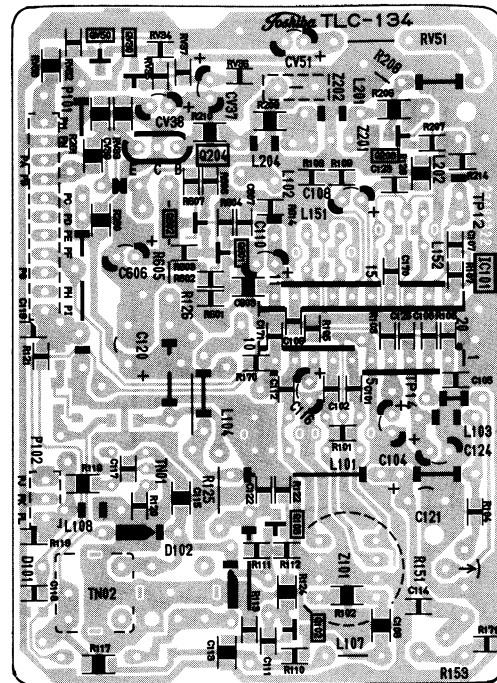


# MAIN BOARD PB1400 BOTTOM (FOIL) SIDE

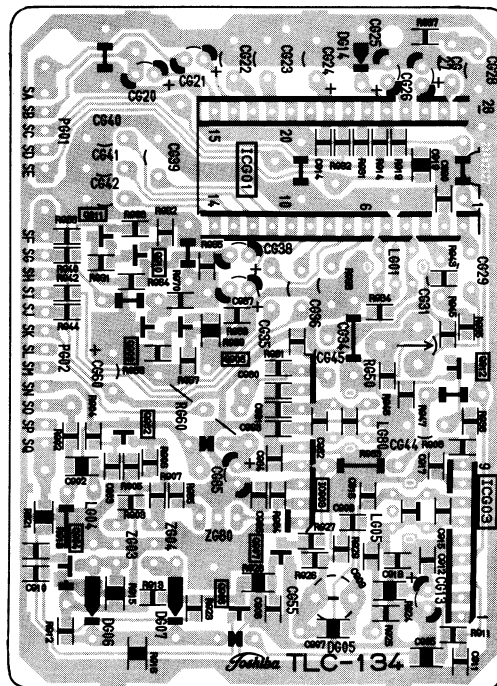




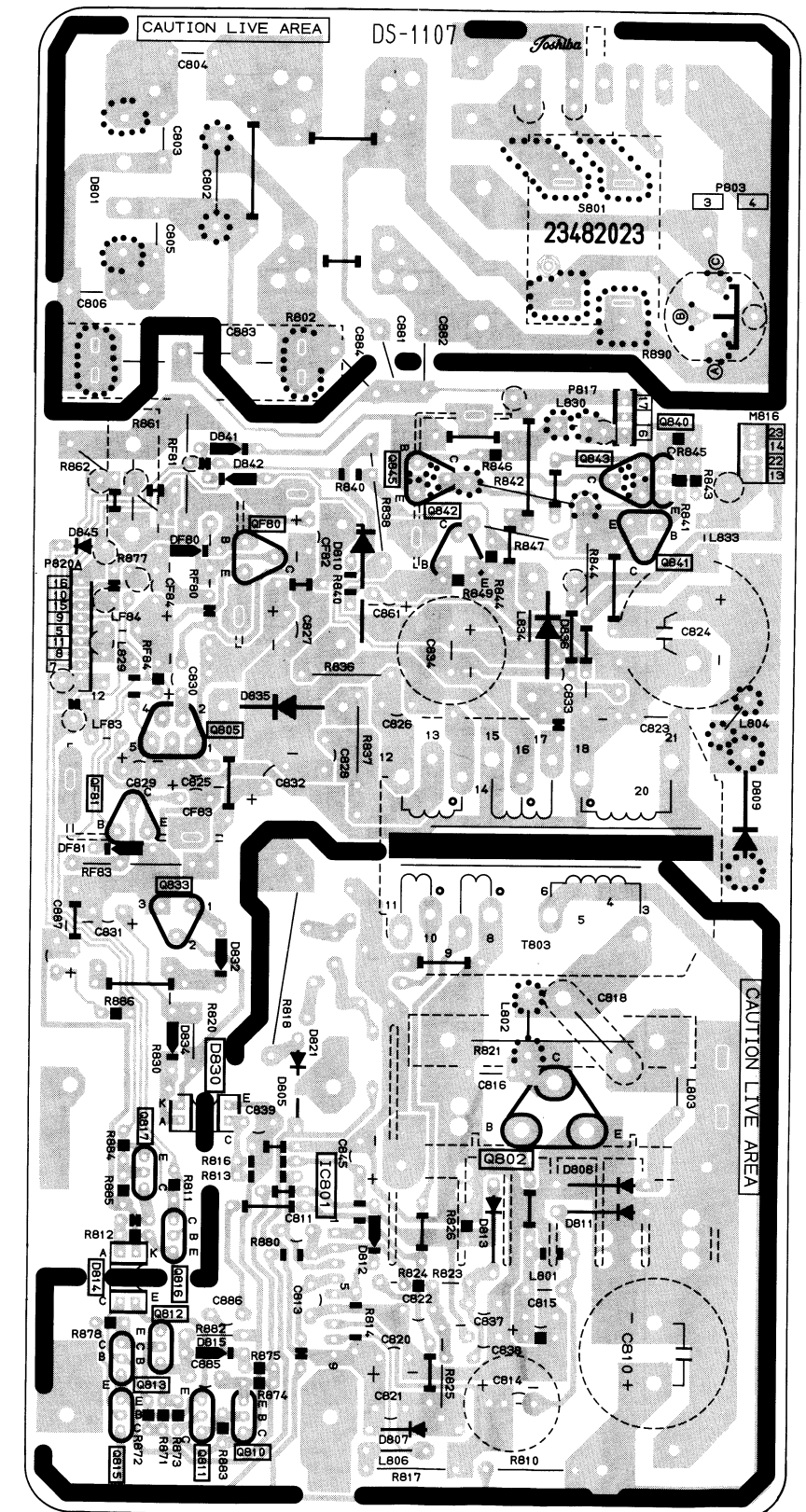
PIF BOARD PB1399-1  
BOTTOM (FOIL) SIDE



IGR BOARD PB1399-2  
BOTTOM (FOIL) SIDE

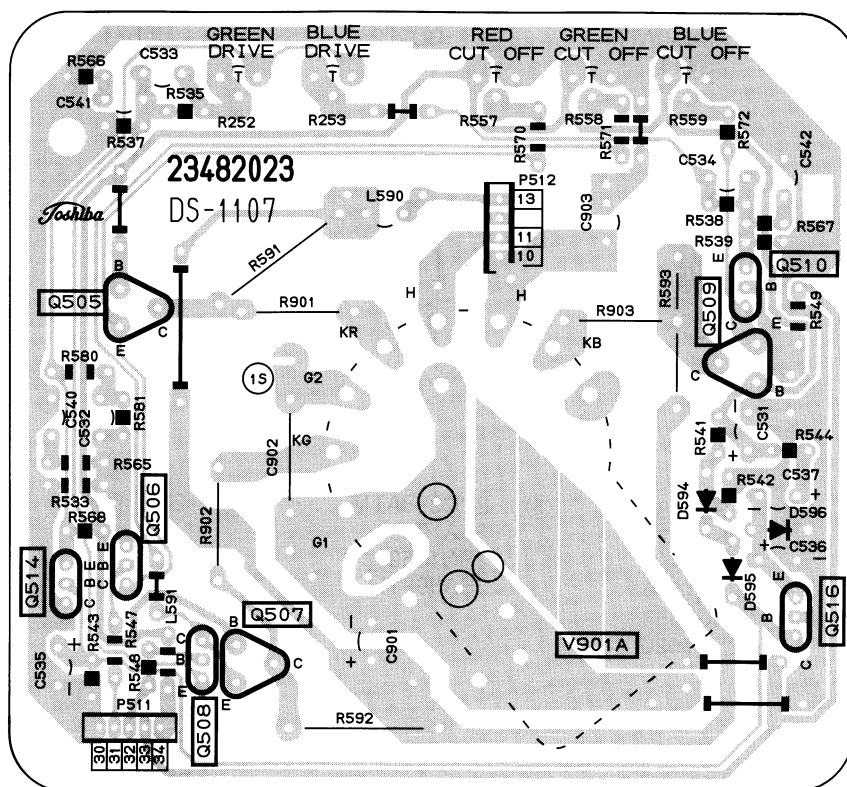


POWER-1 BOARD PB1401-1  
BOTTOM (FOIL) SIDE

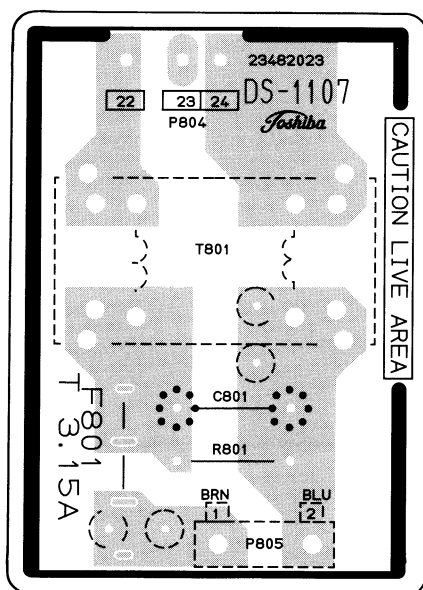




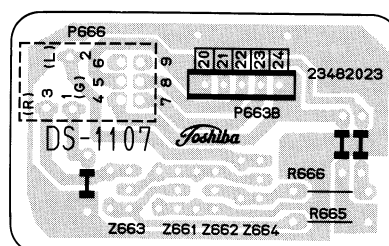
**BOTTOM (FOIL) SIDE**



**BOTTOM (FOIL) SIDE**



**BOTTOM (FOIL) SIDE**





## TERMINAL VIEW OF TRANSISTORS

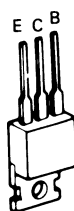
① BC327  
BC337  
BC547A  
BC547B  
BC547C  
BC557A  
BC557B  
BC556A



② 2SK30ATM  
2SK117



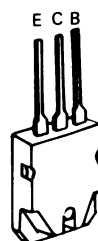
③ BD202



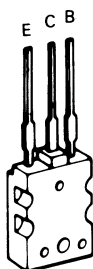
④ BF871  
2SD553  
2SC1569



⑤ 2SC3678  
2SC3182N



⑥ 2SD1427  
2SD1432



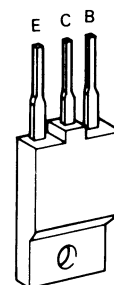
⑦ 2SC2482  
2SA1321  
2SC2230  
2SA1020  
2SC2655  
2SC752GTM



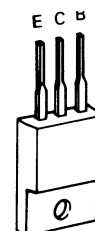
⑧ 2SC388ATM  
2SA1015  
2SC1959  
2SA562TM



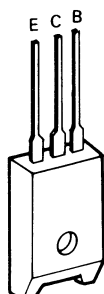
⑨ 2SD1548



⑩ 2SC2023



⑪ ON4409





# 2112DDT

## SCHEMATIC DIAGRAM (2/2)

### IMPORTANT SAFETY NOTICE

Component marked with the International Hazard Symbol must, if changed, be replaced by an approved type and must be mounted as the original. This will ensure that the safety standards adhered to during manufacture will be maintained following any servicing procedure.

### OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltage readings were obtained using a high impedance digital voltmeter.
2. (—) or ground lead of instruments should be connected to the ground marked (⊥) in the schematic on checking Non-isolated circuit surrounded by mark but should be connected to the points marked (≡) on checking isolated circuit.
3. The voltage readings may vary as much as  $\pm 20\%$ .
4. Check that the Tuning, A.F.C., Brightness, Contrast and Colour controls are adjusted for the best picture, making sure that the Contrast, Brightness and Colour controls are set near to their mid-positions.
5. The waveforms were taken using a standard colour bar signal and were observed using a wide band oscilloscope via a low capacity probe.

### NOTES:

1. This circuit diagram is subject to change without notice.

### EXPRESSION

#### VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000.
2. Unless otherwise noted in schematic, all capacitor values less than 1 are expressed in  $\mu\text{F}$  and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in  $\mu\text{H}$ , and the values less than 1 in H.

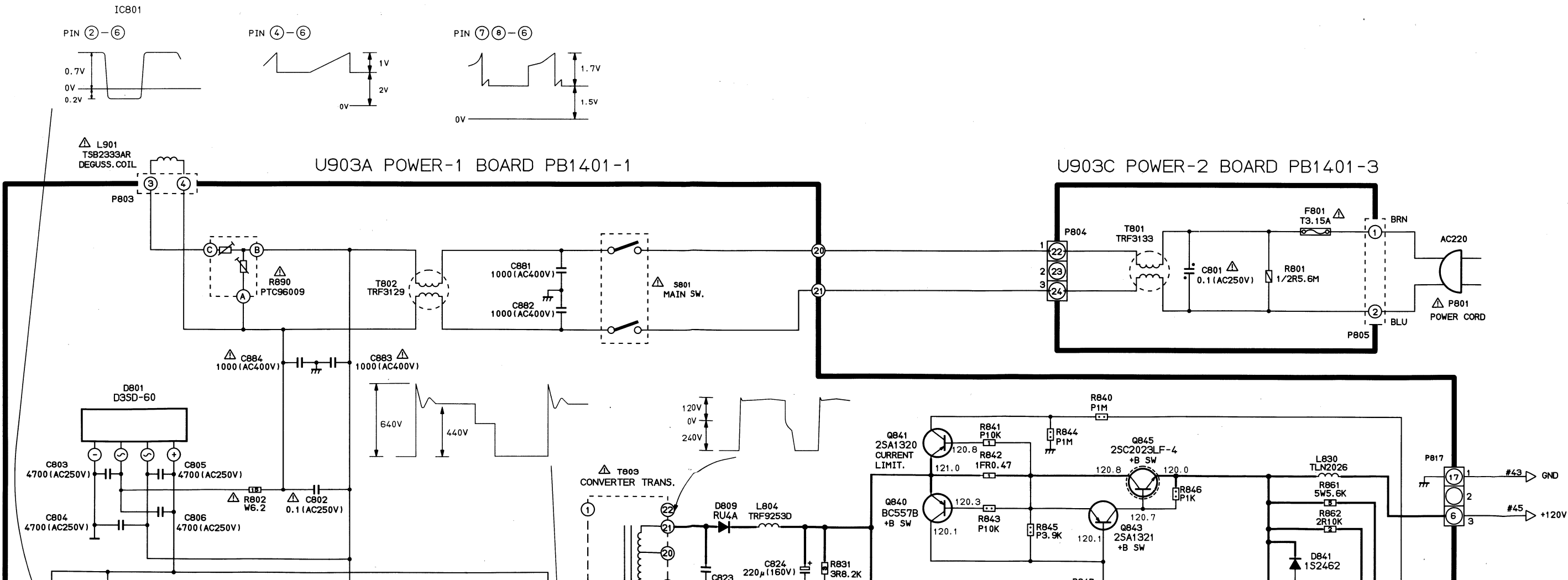
#### GROUNDING SYMBOL

1. ⊥: Non isolated ground, ≡: Isolated ground.

### RESISTOR

Prefixed to value

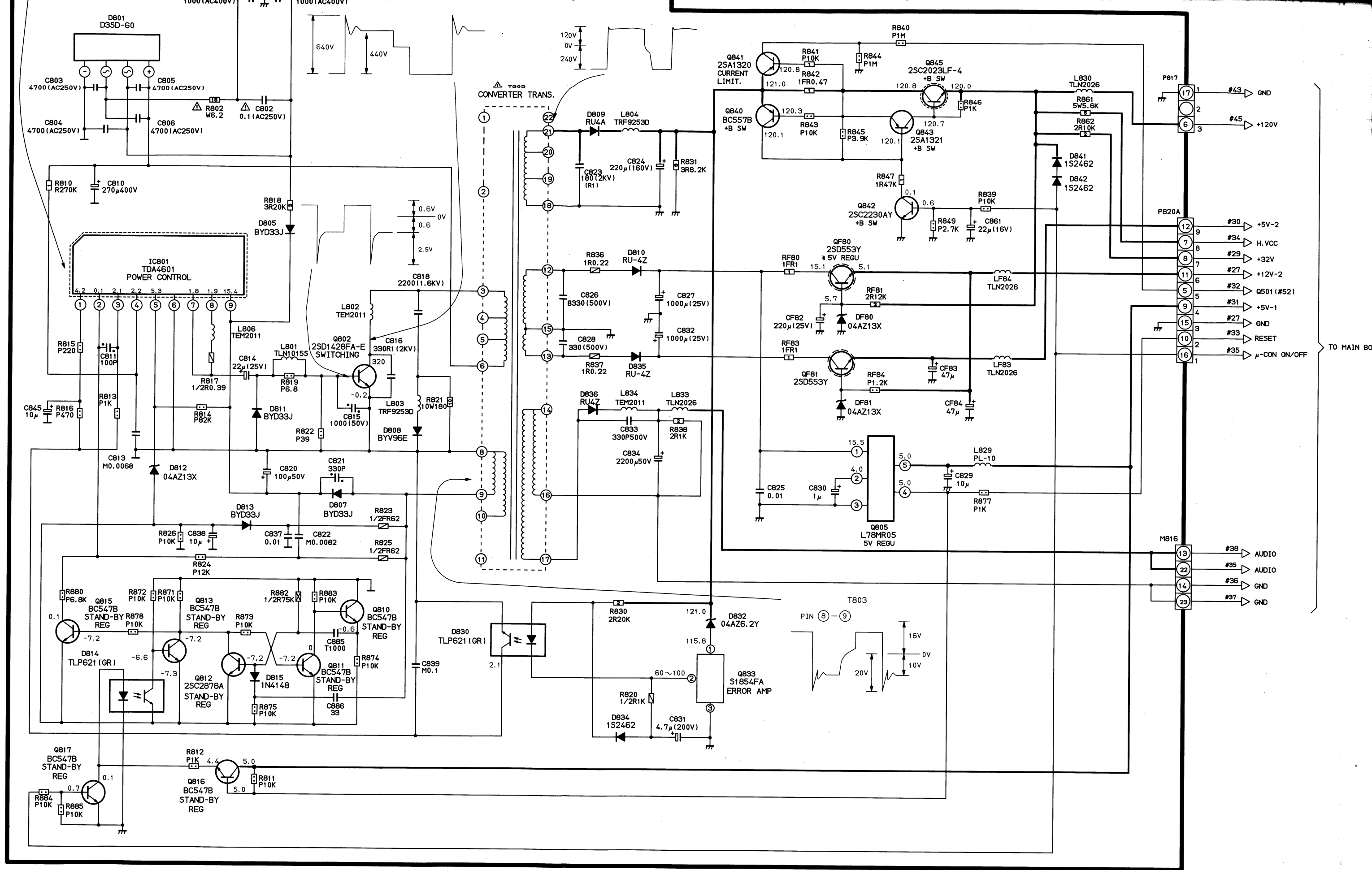
| TY        |
|-----------|
| Carbon    |
| Oxide M   |
| Ins. Carb |
| Wire W    |
| Cement co |
| Fusibl    |



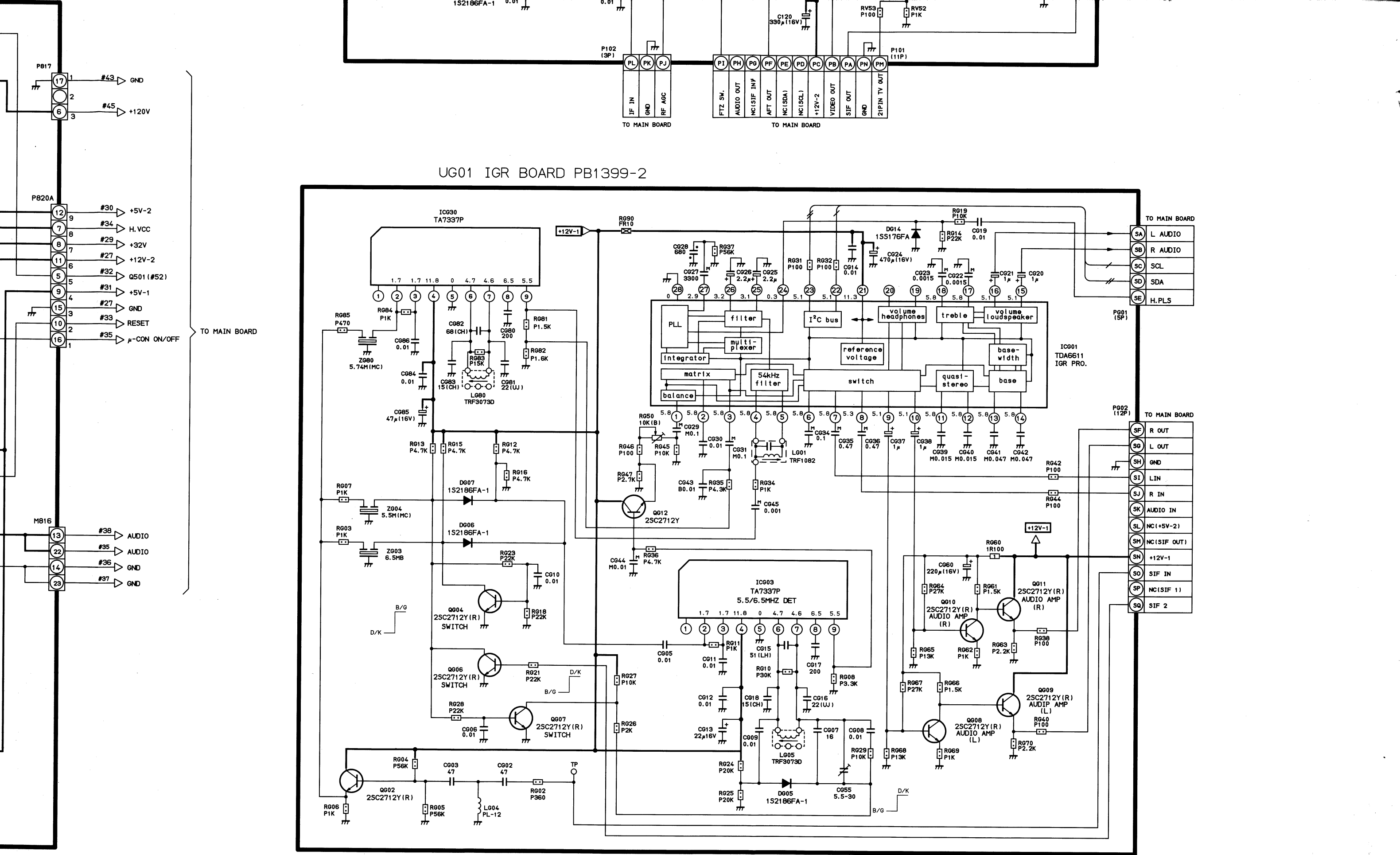








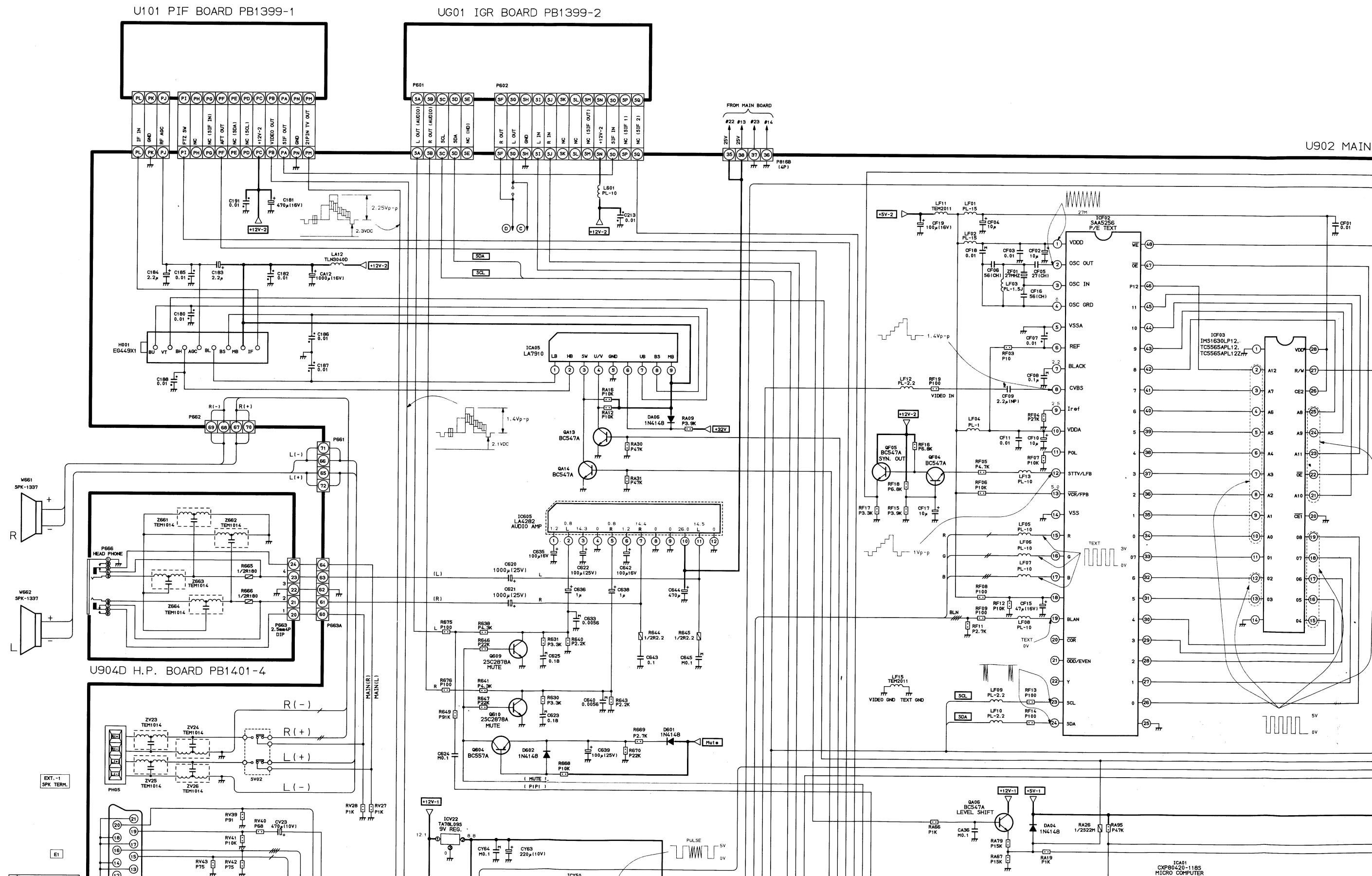




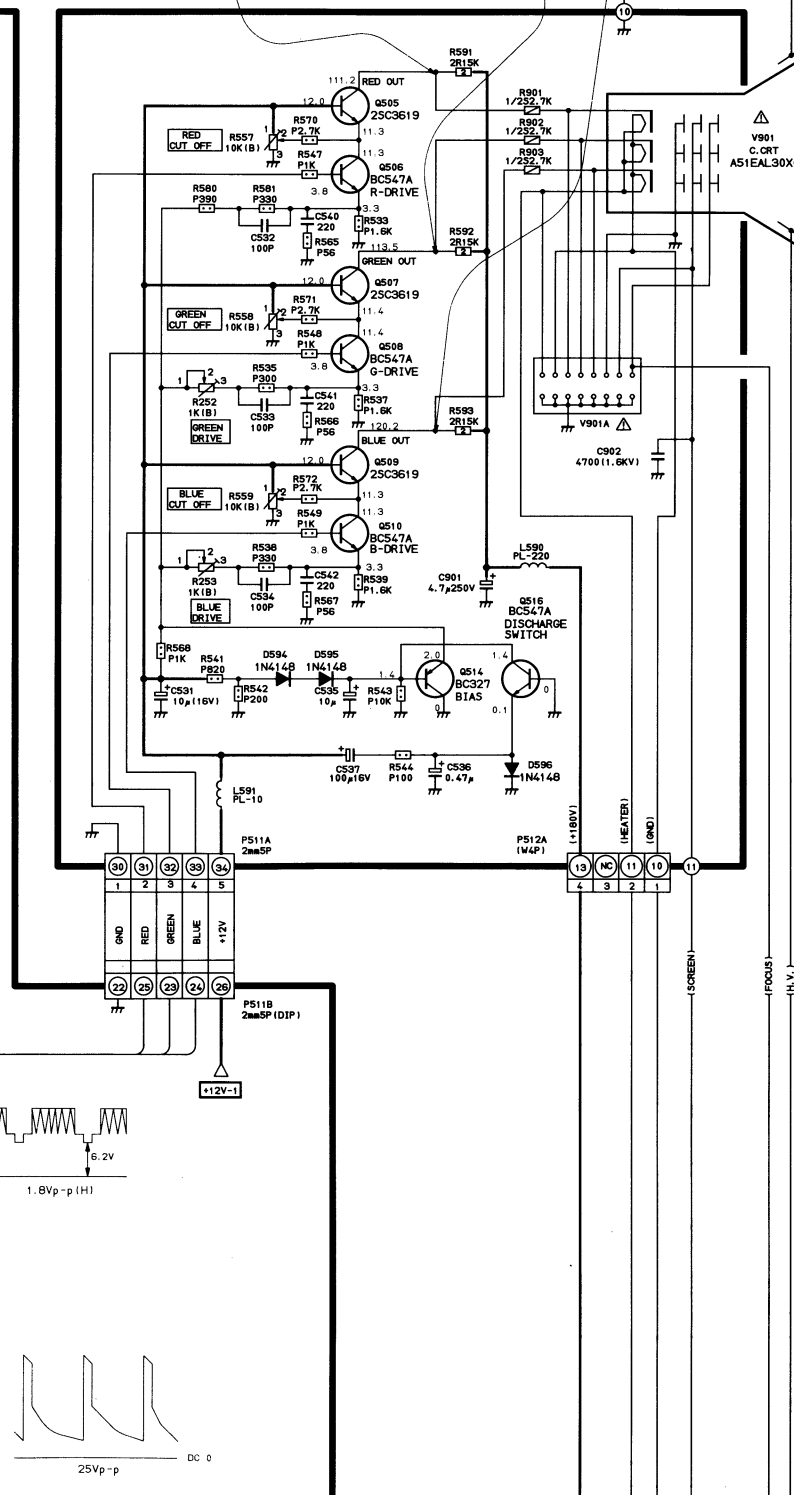
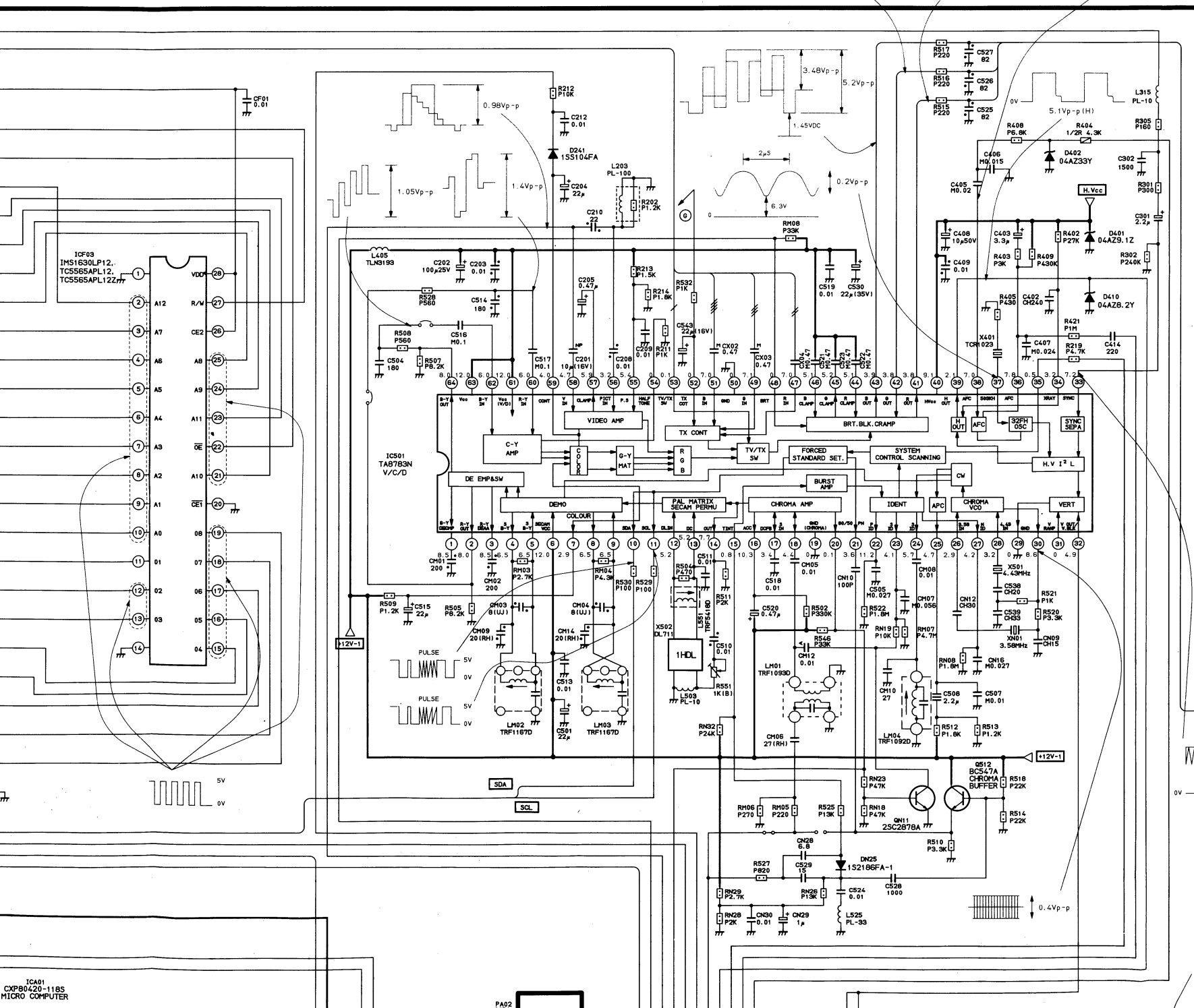
UG01 IGR BOARD PB1399-2



## SCHEMATIC DIAGRAM (1/2)









|    |                 |
|----|-----------------|
| 21 | SHIELD EARTH    |
| 20 | VIDEO IN        |
| 19 | VIDEO OUT       |
| 18 | RAPID BLK EARTH |
| 17 | VIDEO EARTH     |
| 16 | RAPID BLANKING  |
| 15 | RED IN          |
| 14 | NC              |
| 13 | RED EARTH       |
| 12 | NC              |
| 11 | GREEN IN        |
| 10 | NC              |
| 9  | GREEN EARTH     |
| 8  | EXT/TV          |
| 7  | BLUE IN         |
| 6  | AUDIO IN (L)    |
| 5  | EARTH           |
| 4  | AUDIO EARTH     |
| 3  | AUDIO OUT (L)   |
| 2  | AUDIO IN (R)    |
| 1  | AUDIO OUT (R)   |

E1

E2

E3

V

